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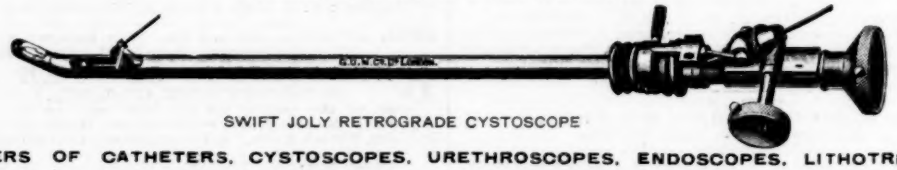

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A PATHOLOGICAL AND CLINICAL STUDY.

BY ROBERT MAILER, M.D. EDIN., M.S. MINN., F.R.C.S. EDIN.,

ASSISTANT SURGEON, VICTORIA INFIRMARY, GLASGOW; LATE FELLOW IN SURGERY, MAYO FOUNDATION, ROCHESTER, MINNESOTA.

IN 1858, at a meeting of the Pathological Society of London, Sydney Jones reported the case of a man who had suffered from a fistulous communication between the bladder and the bowel, secondary to an inflamed and ulcerated diverticulum of the sigmoid flexure. In spite of this striking demonstration, nearly 70 years ago, of the existence of diverticula of the large bowel as distinct entities, and also of their rôle in the production of grave pathological processes, it was not until 1898 that Graser, by emphasising their importance in the production of stenosing types of inflammation simulating carcinoma, caused attention to be seriously focused on them for the first time. Then the contributions of Mayo, Wilson and Giffin, Beer and Brewer in America, and of Moynihan and Telling in England, established diverticulitis as a well-defined clinical entity with definite sequelæ. In spite of the extensive literature which has since grown up around the subject, diverticulitis cannot be said to be a common disease. At the Mayo Clinic, however, such a wealth of clinical and pathological material bearing on this subject has been available that a study of the disease from all aspects has been rendered possible. Especially has one been able to collect data with reference to the frequency of occurrence of diverticula of the lower bowel, the frequency and character of the pathological changes which may be superadded, as well as to those measures which have been found most successful in the treatment of the latter. The material has been gathered from the post-mortem room, and from the operating room were obtained resected specimens from cases of surgical diverticulitis. For clinical data, the records of cases occurring at the Mayo Clinic during the last 15 years have been consulted.

Incidence and Distribution.

The most recent radiological records of the incidence of diverticula are those by Spriggs and Larimore. In a series of 1000 radiological examinations of the colon Spriggs found diverticula in 10 per cent. Larimore found diverticula in 1·24 per cent. of 4406 cases. At the Mayo Clinic, in 1925, diverticula were found in 5 per cent. of cases in a series of 4484 radiological examinations of the colon. From April 1st, 1923, to April 1st, 1924, in 498 necropsies at the Clinic (excluding partial necropsies and necropsies on still-born children), diverticula were found in 34 cases (about 7 per cent.). All but two of the patients in this series were over 45 years of age. Making the necessary corrections, one could say that roughly 13 per cent., or one person in eight over the age of 45, showed diverticular formation in the large bowel. It was found almost twice as often in men as in women, although there was no marked preponderance of males over females in the total series studied.

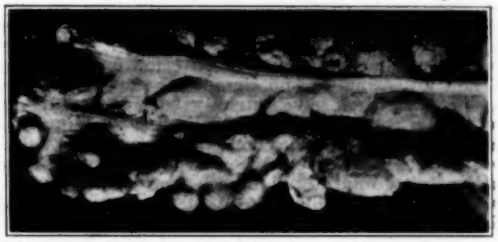
In 53 specimens examined, diverticula were confined to the sigmoid flexure alone in 22 cases (40 per cent.). They were scattered throughout the entire colon in 16 cases (30 per cent.). Rarely the cæcum, ascending colon, splenic flexure, and upper rectum were each involved, alone or with the sigmoid. The point to be emphasised is that the sigmoid is involved in between 70 and 80 per cent. of the total number of cases showing diverticular formation; these findings correspond closely with those determined by X ray examination. Moynihan stresses the appendix as a very common site; this was not borne out in the post mortem series examined.

MACROSCOPIC APPEARANCE.

Diverticula in the large bowel vary from almost microscopic dimensions to about 2 cm. in diameter. They have been seen as large as 4 cm. in diameter, but this is exceptional, and there appears to be definite limitation to their capacity for growth and development.

In situ they are almost completely concealed from view because of their tendency to occur in that part of the intestine that is heavily laden with fat. The increase of the subserous fat and the coalescence of the appendices epiploicæ may cause a distinctive tuberous appearance of the bowel. When the fat is stripped, the diverticula are seen typically as bluish-black flask-shaped or pyriform out-pouchings, set roughly in two parallel rows. This colour is distinctive of the so-called false diverticulum, in which mucosa and submucosa are herniated through the muscular coat. At the base or neck, the muscularis passes up for a short distance on the wall of the diverticulum, forming a narrow whitish strip or collar which is easily distinguished from the bluish fundus or cupola beyond. Only about 75 per cent. of the cases examined, however, showed increase in the subserous fat and in the size of the appendices epiploicæ. In the remainder, where there was no such increase, the patients were either old or had died from malignant disease in which cachexia was prominent. In one or two instances the fatty increase appeared to be strictly localised to the site of the diverticula. This may be explained partly by the tendency of diverticula to extend into and expand the appendices epiploicæ.

FIG. 1.



Multiple diverticula of the sigmoid flexure. The fat of the epiploic appendages has been removed to demonstrate the sac more clearly. Relationship to the longitudinal muscle bands and disposition roughly in two rows may be noted.

The bluish-black appearance of false diverticula is dependent on the presence of fæcal matter within the lumen. Fæcoliths, however, are not invariably found, even in sigmoid diverticula, although spasticity in this area, coupled with the inspissated nature of the intestinal contents, certainly makes them common. Small diverticula with wide mouths, occurring in the non-spastic bowel, often contain no fæcal matter at the time of examination, and are pale and collapsed. Viewed from the mucosal aspect of the bowel, the appearances depend on the presence of spasticity or rugosity of the mucosa. In about 60 per cent. of the series examined, the mucosa of the sigmoid was thrown into rugæ, running slightly obliquely, and the openings of the diverticula were in the depths of the furrows so formed. In the sigmoid the orifices usually appeared as small slits, elongated in the direction of the rugæ. Where diverticula appeared in a non-spastic gut, the orifices tended to be wider, and the mucosa of the diverticula tended to prolapse slightly into the main lumen of the bowel, so that the orifice appeared as if set on a small papilla.

Even when diverticula are multiple throughout the colon, they are almost invariably scarce in the cæcum and ascending colon. Moreover, they are smaller than diverticula of the sigmoid, for they are not subjected to the stretching dependent on the accumulation of fæcal matter within them. Spasticity in this portion is usually absent, the orifices of the diverticula are wide and generally somewhat raised from the plane of the mucosa of the bowel, producing the papillar appearance. These diverticula are usually empty, and can be readily invaginated into the interior of the bowel. The transverse colon, on the other hand, is often spastic, and the multiple small segmentations into which this portion is thrown by the contraction of the longitudinal tæniæ may give, prima facie, a close mimicry of diverticular formation.

Although diverticula may be numerous in the lower sigmoid, they are rare in the upper rectum, probably owing to the greater thickness of its wall. The rectum was affected in two cases only in the series studied.

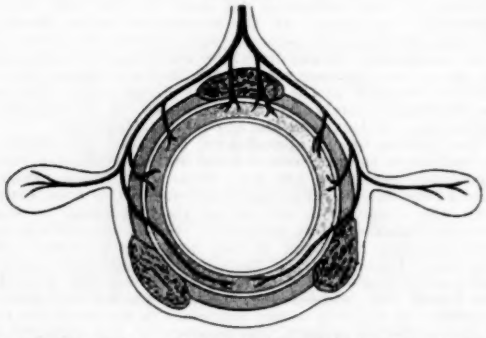
Their Site in Relation to Circumference of the Bowel.

The exact situation of diverticula in relation to the circumference of the bowel is remarkably constant. They appear between the mesocolic and the antimesenteric longitudinal muscle bands, rather closer to the latter than to the former. The diverticula are definitely related to the blood-vessels entering from the mesentery.

It will be seen from Fig. 2 how easy it is for a diverticulum, once it has extended beyond the plane of the muscular coat, to pass into an appendix epiploica. While this is common, it is not invariable. I have never seen diverticula of the large bowel entering between the two leaves of the mesentery as diverticula of the small intestine are so apt to do, and in only one instance have I seen them appearing on the antimesenteric aspect of the bowel between the two antimesenteric muscle bands. When numerous in the sigmoid, however, they may not confine themselves strictly to the vessel points, but, as a result of the generalised weakening of the musculature, they may crop out promiscuously all over the area between the mesocolic and the antimesenteric longitudinal muscle bands. I have seen one instance in which the diverticula were splitting the fibres of the longitudinal muscle band.

The segmental contractions of the bowel force fæcal matter into the diverticula and the narrow orifices, and the lack of muscular coat in the expanded portions prevents its expulsion. The fæcal matter becomes moulded to the shape of the diverticular cavity and forms a concretion which usually resembles closely, both in shape and consistency, those in the appendix. They are easily removable, although occasionally I have seen them so closely incorporated with, and adherent to, the mucosal lining of the sac that the lining was completely stripped off by the

FIG. 2.



The point near the antimesenteric muscle bands, where the muscular coat is pierced by the blood-vessel entering from the mesentery, is an area of lessened resistance, and constitutes the seat of election for diverticula (after Drummond).

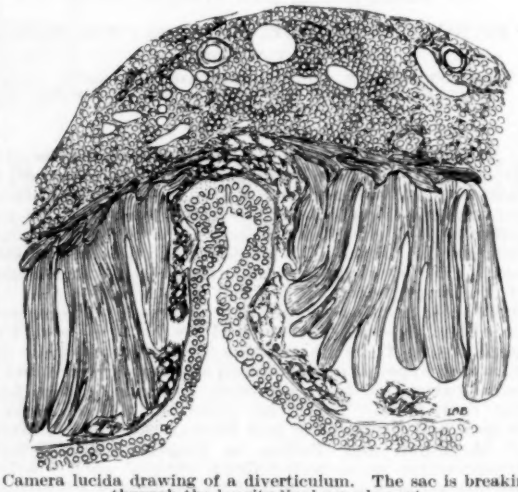
attempt to remove the concretion. Even in the sigmoid, however, the contents of the diverticula are often quite soft, and in the remaining portion of the large intestine, particularly the ascending and transverse colon, the diverticula are often empty, or are filled with soft fæcal matter. This, of course, is due largely to the well-established physiological fact that, generally speaking, the contents of the right half of the colon are fluid and of the left half solid.

Development and Microscopic Anatomy of Diverticula.

Diverticula first appear as little pits in the mucosa. Mucosa and submucosa then extend up through the circular muscle coat, and in the earliest stages may look like exaggerated spasticity of the bowel.

Arriving at the longitudinal muscle coat, the growing diverticulum either breaks through this or carries it in front of it. In Fig. 3, both circular and longitudinal coats have given way, and the outpouching is ready to extend beyond the plane of the bowel as a so-called "false"

FIG. 3.



Camera lucida drawing of a diverticulum. The sac is breaking through the longitudinal muscle coat.

diverticulum. In other cases the longitudinal coat, although thin, appears to remain intact for a considerable time, but ultimately undergoes pressure atrophy from the continued growth of the diverticulum. In Fig. 4, for instance, muscular fibres can be traced along the wall of the diverticulum for at least half the distance towards the fundus. Beyond this, Van Gieson's stain demonstrated considerably fragmented muscle-fibres around the fundus of the saccule, gradually being replaced by fibrous connective tissue. The ultimate outcome, in most cases, is a diverticulum of the "false" type, lacking muscular coat.

Fig. 4 is typical of the appearance of the average false diverticulum of the sigmoid. It shows the rather redundant mucosa of the main lumen of the bowel, the narrow neck of the diverticulum where it passes through the muscular coat, and where, in the absence of a fæcolith extending to the orifice, the spasticity keeps the opposing walls in contact. Beyond is the pyriform expansion into the appendix epiploica. The mucous lining of the diverticulum is normal.

I believe the final tendency in all diverticula of the large bowel is towards the production of the false type of sac. On the other hand, in a certain proportion of diverticula a muscular coat is retained, and these can be classified as true diverticula. At the same time, it is probable that they are simply stages in the development towards the false type. Again, if chronic inflammatory changes develop around diverticula, their further growth tends to be arrested.

ÆTIOLOGY.

The first aspect of the problem to be considered is whether the diverticula are congenital or acquired, or whether there are two distinct types. The fact that several cases have been described at early ages favours a congenital basis, and there is also the association, in a proportion of cases, with diverticula elsewhere in the body. In the 53 cases examined post mortem, diverticula of the colon were found associated with diverticula of the duodenum in four cases, with diverticula of the jejunum in two, and with diverticula of the bladder in two. In other words, the coexistence is not common enough to favour a congenital origin. That diverticula of the colon are sometimes congenital must, I think, be admitted, but they are rare. The cases reported by Hartwell and by Fütterer and Mitteldorph are undoubtedly congenital.

Acquired Diverticula.—As a rule, the occurrence of diverticula in middle and later life is overwhelming

evidence that they are acquired. The age-incidence in 100 cases of diverticulitis verified by operation is shown in Table I. Eighty-five per cent. of the patients

TABLE I.—*Age-incidence in 100 Cases of Diverticulitis.*

Age.	M.	F.	Age.	M.	F
20 to 30 ..	0 ..	1	50 to 60 ..	25 ..	11
30 to 40 ..	6 ..	4	60 to 70 ..	19 ..	5
40 to 50 ..	17 ..	8	70 to 80 ..	3 ..	1

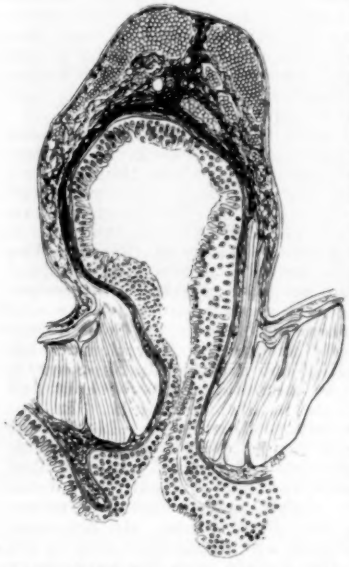
TABLE II.—*Average Weight of Patients in Clinical Series.*

—	Cases.	Av. weight in lb. previous to onset of symptoms.	Av. weight in lb. at time of exam.
Males	55	179	166
Females	20	157	149

in this series were between the ages of 40 and 70, so that apparently diverticula begin to affect persons in middle life, and are especially common in advanced middle age and old age.

The earlier observers, including Graser and Hansemann, stressed the repeated increases in pressure from constipation and gaseous distension as being important factors in ætiology, but there are many reasons for believing that if the wall of the bowel is of normal elasticity there is no apparent distension clinically which will produce diverticula. Again, though Graser, Hansemann, Hanau, and Klebs concentrated on the vessel points in the bowel wall as constituting the key to the ætiology of diverticula, these vessel points are probably to be regarded more correctly as determining the site of the diverticula than as important ætiological factors in their formation.

FIG. 4.



Camera lucida drawing of a diverticulum passing into the epiploic appendage. Muscle-fibres were demonstrated around the fundus of the diverticulum. A mild degree of subserous fibrosis may be noted.

Most observers have noted the tendency for diverticula to occur in rather obese persons, but the obesity in these cases is most probably the concomitant of middle age and its attendant restricted physical activity, with resultant lowered plane of metabolism and less perfect oxygenation of the tissues. With few exceptions diverticula occur after the age of 40, when the patient is entering on the degenerative period of life. It seems logical enough to assume that the loss of tone and elasticity of muscle which accompanies advancing years is not confined to striated muscle, but affects the unstriped muscle throughout the body, including that of the intestine. Recently Spriggs and Marxer, from a series of excellent radiological studies, suggest that the diverticula may result from a preceding inflammatory process, but in my own pathological studies I was unable to demonstrate this.

SECONDARY CHANGES.

The secondary pathological processes superimposed on diverticula may be divided into mechanical and inflammatory.

Mechanical Processes.—Fæcal concretions may produce mechanical irritation of the mucosa of the diverticulum, bringing about a condition favourable to the multiplication of micro-organisms and to their passage beyond the lumen of the diverticulum. Since concretions of considerable hardness are found only in the sigmoid flexure, it follows that for practical purposes inflammatory conditions superimposed on diverticula are confined to this region. The right half of the colon, where the intestinal contents are fluid, is practically immune. However, it is remarkable to what extent the mucosal lining of a diverticulum may be thinned out through pressure atrophy from a concretion and yet inflammatory changes be absent. Fæcal concretions often project slightly into the main lumen of the bowel and the tip may be exposed to pressure from the main bulk of the fæcal mass. Cases of sudden pistol-shot perforation occurring during strain have been described by Murray. In the series of cases at the Mayo Clinic there was no record of such an accident. The presence of foreign bodies other than fæcal concretions has been described by Bland-Sutton. These have been accused of setting up inflammation.

FIG. 5.

Diverticulum in cross section. A collection of lymphocytes, and, incidentally, grades of inflammatory reaction in the subserous coat may be noted.

Inflammatory Changes in Diverticula.—Theoretically, one would consider the diverticulum with its irritating and infected fæcal contents to be an ideal nidus for the development of micro-organisms, and for the occurrence of inflammation of varying grades of severity. This does certainly occur, but comparatively seldom. Of 34 cases in which diverticula were found post mortem in one year, only one showed chronic inflammatory subserous changes of any degree of severity, and even in this case the inflammation was latent and asymptomatic. Three or four cases showed microscopically mild chronic inflammatory changes in the subserous fat. In the remainder no inflammatory changes were found. This point is worth emphasising. Radiologically, diverticula are by far the most common lesions in the colon; they are at least three times more common than the next most common lesions—namely, carcinoma and ulcerative colitis. Diverticulitis, on the other hand, is rare, and probably not more than 10 per cent. of the cases ever require surgical intervention for gross inflammatory complications. It is for this reason that the term diverticulosis, referring to the mere presence of uncomplicated diverticula, is preferable; the term diverticulitis should be reserved for the relatively small number of cases that give evidence of superadded inflammation.

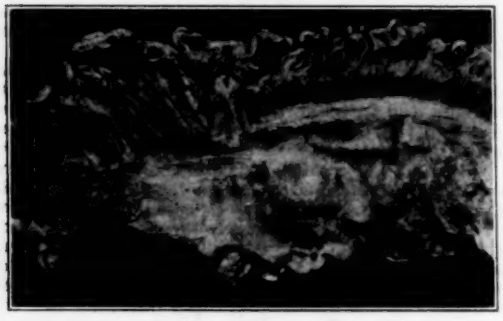
Inflammatory changes in and around diverticula may be arbitrarily divided into acute and chronic. Acute infections are often superimposed on chronic inflammatory changes and the latter are much more common.

In the *mild* types, little may be seen by the naked eye to draw attention to secondary inflammatory changes. Often, however, the fat of the appendices epiploicæ is

rather coarser and more fibrous than usual. Microscopically, the mucosa of the diverticulum may be almost normal, or slightly atrophied from the pressure of the concretion. Towards the fundus or apex of the diverticulum small collections of lymphocytic cells may be seen in the deeper parts of the mucosa (Fig. 5). These are irregular in distribution and may overlap the muscularis mucosæ so as to give the appearance of gaps in its continuity. These collections of lymphocytic cells resemble lymphoid follicles except that they are irregular in shape and distribution and do not have the appearance of a germinal centre. The solitary follicles may be found lying alongside them and are then quite easily distinguished. These lymphocytes are the response to the extension from the cavity of the diverticulum into the surrounding tissues of an attenuated poison—toxins of bacteria rather than the bacteria themselves. Outside the diverticulum there is some fibrous connective tissue in the immediate neighbourhood of the fundus, indicating the source of the chronic irritation from which it originated. The submucous fibrous coat, which followed the mucosa in its herniation through the muscle, is compressed into a compact and dense layer which usually cannot be well distinguished from the new fibrous connective tissue.

The *severer* grades of chronic inflammation are far more important from the surgical standpoint. In Fig. 6 the long narrow diverticula are seen passing up between the rugæ and extending beyond the muscular coat. In the subserous coat the thick layer of fat has been almost entirely replaced by dense white fibrous connective tissue, forming a homogeneous layer about 3 cm. in thickness, dull pearly-white, and cutting almost with the consistency of an unripe pear, so that it closely resembles carcinoma. Under the microscope, the mucosa, submucosa, and muscle coat show practically no changes, and there may be only very slight evidence of chronic inflammation in the mucosa of the diverticulum, manifested by a few foci of lymphocytes towards the fundus, slight mucosal atrophy, and diminution in the number of the gland crypts. The changes in the neighbouring subserous coat are most striking. It is for this reason that Wilson some years ago suggested the term "peridiverticulitis" as being more appropriate. All grades of transition from the original subserous fat to complete replacement by dense fibrous connective tissue are met with. The fibrous tissue is denser and less cellular in the immediate vicinity of the diverticula, while beyond, where the fat replacement is not complete, the connective tissue

FIG. 6.



Portion of sigmoid removed at operation showing fairly typical diverticulitis and peridiverticulitis.

is younger and more vascular, and cells of inflammatory origin may be present. Small collections of lymphocytic cells are found in the region of the blood-vessels, and are sometimes seen extending in long lines along the lymph spaces between the fat cells. Fibroblasts appear, and young cellular and vascular tissue is formed. Towards the serous coat the process is less advanced, and fibrocellular strands can be seen extending between the fat cells (Fig. 7). Besides lymphocytes, there are lamellar connective tissue cells and plasma cells. Plasma cells, however, are seen only in the subacute or acute types of inflammation.

The final tendency is towards the formation of dense and more avascular connective tissue, replacing the normal structure of the subserous coat of the bowel. This renders the intestinal wall rigid, so that it loses its contractile and propulsive character and favours stasis. Again, the contraction of the fibrous tissue increases the already existing rugosity of the mucosa and consequently reduces the lumen. The last factor which may aid in the production of obstruction is angulation of the bowel, which is the result of adhesions and chronic inflammatory changes in the mesentery of the sigmoid. Peridiverticulitis of any degree is rarely present without some coexisting reaction of the peritoneal coat, and often the reaction is more acute in the peritoneum than throughout

FIG. 7.

A portion of the subserous coat of the bowel, the seat of peridiverticulitis. A collection of lymphocytic cells, and early replacement of the fat by fibrous connective tissue, may be noted. (×150.)

the rest of the bowel wall. The mobility of the sigmoid, together with this adhesive peritonitis, results in adhesions to adjacent viscera, and also of one loop of sigmoid to another; the latter is still further favoured by chronic inflammatory changes in the sigmoid mesentery, which shorten it and approximate adjacent loops.

The occurrence of acute inflammation in and around diverticula is dependent on the presence of particularly virulent micro-organisms rather than on any great weakening of the defensive barrier formed by the wall of the diverticulum. The most common organism found is a diplo-streptococcus, and this is often associated with Gram-positive bacilli resembling the anaerobic Welch bacillus. These acute inflammatory changes can be divided into two groups: those in which there is gross rupture of the wall of the diverticulum, and those in which the inflammatory changes within the diverticulum are milder, and the wall of the diverticulum apparently becomes permeable to micro-organisms without any demonstrable solution in its continuity. In the latter group it is often difficult to identify the diverticulum or, more rarely, diverticula responsible for the acute inflammatory changes. In the first group it is much easier, for there is usually an intense inflammatory zone, visible macroscopically, immediately surrounding the diverticulum. In the cases in which the diverticula are apparently intact, the organisms pass to the surface and the peritoneum shows the greatest degree of reaction, while the other coats may show relatively little change. It is this type of case which presented so much difficulty in the days before the significance of diverticula was recognised, and it was thought that the source of the peritonitis was extrinsic to the bowel. This is the "pericolitis sinistra" of Rolleston.

Acute inflammatory complications in and around diverticula can occur either as the first manifestation of infection in the diverticula, or in association with chronic peridiverticulitis of long standing; these may present considerable differences as regards prognosis

and sequelæ. Diverticula with a thin fatty subserous covering, in which fibrous changes are slight or absent, readily permit of acute involvement of the peritoneum. Inasmuch as no adhesions have formed, the resultant peritonitis may be widespread, though it rarely becomes generalised. On the other hand, if the diverticula are embedded in a thick layer of fat, and especially if there has been considerable subserous fibrosis, acute infection will travel to the surface just the same, but the sigmoid will have formed adhesions to the side wall of the pelvis or to adjacent viscera and a localised abscess is the most serious complication likely to result.

In the central area of the lumen of the diverticulum (Fig. 8) a portion of the inflammatory exudate, consisting of polymorphonuclear leucocytes, may be seen held together by a small quantity of fibrin. The gland crypts show necrosis of portions en masse, and the process is not so much a simple catarrhal desquamation of cells as a more severe type of inflammation in which necrosis is the prominent feature. Several of the crypts are seen to contain inflammatory cellular exudate, and one of the outlying crypts is seen to have perforated. The muscularis mucosæ and the submucous coat around the apex of the diverticulum have disappeared, and the subserous fibrous connective tissue in the immediate zone has been replaced by massive cellular exudation in which polymorphonuclears, lymphocytes, and plasma cells are intermingled. The reaction outside the diverticulum is more marked than in the diverticulum itself, probably because the main blood-vessels are just outside the sac, and the exudative phenomena are more prominent there. Towards the serous coat, the inflammation is subacute, but well-marked acute peritonitis is present. The microscopic picture in these cases of acute diverticulitis varies a little according to the virulence of the reaction, but

FIG. 8.

Low-power microphotograph of acutely inflamed diverticulum. A collection of polymorphonuclear leucocytes in the lumen of the saccule, and the fragmentation and necrosis of the component crypts may be noted. There is an acute inflammatory zone surrounding the diverticulum. (×25.)

the foregoing features are fairly typical. To these may be added great distension of the lymph spaces with serum, distension and congestion of blood-vessels, and sometimes small localised abscesses in the subserous coat.

SEQUELÆ.

All grades of severity of peritonitis occur, depending on the virulence of the original infection. Unlike the similar process in the appendix, acute diverticulitis rarely gives rise to generalised peritonitis. Localised pelvic peritonitis or localised abscess is the usual sequel. In 74 cases of peritonitis and abscess, 24 presented evidence of acute peritonitis, invariably localised to the pelvis, and in 15 cases an abscess or abscesses were present (Table III). In 19 cases the peritonitis was classified as subacute at the time of operation, and in 26 cases it was chronic, manifested by adhesions to neighbouring viscera. In five cases the lesion was mainly in the mesentery, one case showing acute mesenteritis. In one instance, multiple small abscesses were found, but in the remainder of the 15 cases the abscess was single. Inasmuch as these abscesses are usually found in a mass of adhesions, they may have existed for a considerable time previous to operation; as a consequence, the pus in the older abscesses is often thick and sterile. They rarely contain more than 30 c.cm. of pus. Occasionally, however, when they have formed under the abdominal wall, they have been incised through the skin and considerable pus evacuated.

TABLE III.—*Position of Abscess.*

	Cases.
Between sigmoid and abdominal wall	3
" " and adherent ileum	4
" " or rectum and bladder	3
" " and side wall of the pelvis	2
" " cæcum and appendix	2
In the mesentery	1

Adhesions.—There is a distinct tendency for the sigmoid, which is the seat of diverticulitis and peridiverticulitis, to become adherent to surrounding structures, and this is favoured by the mobility of the sigmoid loop. The adhesions may localise infection, but they also predispose to formation of the fistula and may make radical surgical procedures difficult. Of 100 cases of diverticulitis investigated, adhesions were present in 74. The organs or structures to which the sigmoid was found adherent, together with the relative frequency of these adhesions, is given in Table IV. Adhesions to the bladder are the most common and the most significant. In 14 of the 24 cases, a vesico-sigmoidal fistula had formed. In the 20 cases in which the sigmoid was adherent to the side wall of the pelvis, the most vital structures affected were the left common iliac vessels and the left ureter. In nine cases the left ureter was densely bound down in adhesions, and in one case there was sufficient obstruction to the lower end to produce marked dilatation above. In only one of the 12 cases in which the sigmoid was adherent to the small intestine had actual perforation taken place. In one of the five cases in which the cæcum and appendix were adherent, the tip of the appendix was found lying in an abscess between the sigmoid and the cæcum, but the source of the abscess was diverticulitis and not appendicitis.

TABLE IV.—*Site of Adhesions.*

	Cases.		Cases.
Bladder	24	Cæcum	2
Left side wall of pelvis	20	Appendix	3
Small intestine	12	Abdominal wall	6
Left adnexa	3	Sigmoid	2
Right adnexa	1	Descending colon	1
Uterus	2	Generalised	8

Association of Diverticulitis with Carcinoma and Tuberculosis.

Carcinoma of the sigmoid occurs with diverticula in certain cases. In 1917 W. J. Mayo reported it in 13 out of a series of 42 cases. Inasmuch as chronic irritation in other situations has long been recognised as a factor in the production of cancer, it is certainly plausible to regard prolonged diverticulitis as a precancerous condition. Wilson, as early as 1911, drew attention to the apparently close relationship of the two conditions and reported four cases.

I have examined eight cases in which diverticula or diverticulitis coexisted with carcinoma. Without giving the detailed macroscopic and microscopic descriptions on which my opinions are based, I would summarise my findings by saying that the question whether the carcinoma develops propter hoc and not simply post hoc must remain undecided, but my impression is that the malignant process starts in the main lumen of the bowel and not in the diverticula, although the latter may be involved by extension. The gross inflammatory changes in these cases are, I believe, more often dependent on the malignant disease than on the diverticula. It is impossible to determine whether a chronic inflammatory process affecting chiefly the subserous

layer can have much effect in determining the genesis of carcinoma in the main lumen of the bowel. In one case the carcinoma involved the recto-sigmoid, while the mass from peridiverticulitis formed a localised tumour several inches higher in the sigmoid, the intervening area of bowel being apparently normal. W. J. Mayo states that, excluding the stomach, most gastro-intestinal cancers are situated at the recto-sigmoid. Diverticulitis, on the other hand, is just as likely to affect the sigmoid higher up. Since approximately one person in every eight over the age of 45 has diverticula of the sigmoid, and since diverticulitis and carcinoma are most common at the same age period, it is reasonable to assume that they will coexist in a certain proportion of cases. I believe that the degenerative changes in the sigmoid consequent on advanced middle age, constitute a common factor responsible both for the occurrence of diverticula and for the higher incidence of carcinoma at this age.

In two cases tuberculosis of the sigmoid was found coexistent with diverticulitis. These are discussed in another article. Hyperplastic tuberculosis of the sigmoid gives a pathological appearance which is almost identical with that of diverticulitis, and when both occur in the same segment of bowel, there is great difficulty in assessing the rôle which each plays in the pathological picture produced.

Clinical Features.

In the absence of inflammatory changes, diverticula may not cause symptoms. However, the colon which is the seat of diverticulosis is often spastic and there may be considerable constipation. Even then it may be difficult to determine whether the constipation is due to diverticula or to the habit of the individual. On the other hand, this spasticity may be so marked as to cause symptoms suggestive of organic obstruction, and one is frequently surprised at operation to find but slight interference with the calibre of the bowel when the severity of the clinical symptoms had suggested moderately severe organic stenosis. Again, when inflammatory complications are present, even though there are only one or two diverticula in the sigmoid, one may become acutely inflamed and thus bring the patient to the surgeon. In such cases obstruction may not be a feature, and there may be little previous history to direct one's attention to diverticulosis of the sigmoid as the probable ætiological agent. In most cases there is gradually increasing stenosis of the bowel from chronic diverticulitis and peridiverticulitis, producing more or less constipation. From time to time, however, superadded acute inflammation may cause a flare-up, during which the sigmoid becomes swollen and tender, and partial or complete obstruction may supervene. The patient may seek advice during the first of these attacks, or may pass through several of them with partial or complete relief in the intervening period. Many of the patients come to the physician with complaints which immediately suggest an investigation of the left lower quadrant of the abdomen, but this is not invariable (Table V.).

TABLE V.—*Primary Complaint in Cases of Diverticulitis.*

	Cases.
Pain in left iliac fossa	42
Urinary symptoms	16
Pain in both lower quadrants	11
Increasing constipation	13
Abdominal pain not localised	8
Epigastric distress	4
Pain in region of umbilicus	3
Pain in rectum	3
Bleeding from the bowel	5
Diarrhœa	4

Classification of Cases.

I found that these 100 cases fell, roughly, into six groups.

Group 1 is made up of cases in which there was a long history, extending over months or years, of gradually increasing intestinal symptoms ultimately amounting to chronic obstruction, or terminating more abruptly in subacute or acute obstruction. It comprised 28 cases, in 11 of which the symptoms terminated in an acute attack, and in one in a subacute attack. In the remaining 16, the symptoms were those of gradually increasing constipation, but without any acute or subacute attack.

In *Group* 2 there was a history of repeated attacks of acute or subacute obstruction with intervening periods of almost complete freedom from symptoms, or at the most only constipation. There were 29 cases in this group; in all but two there was a history of two or more acute or subacute attacks.

Group 3 is a combination of the two preceding groups; there was an early history of months or years of gradually increasing constipation, followed by a period in which there were repeated attacks of acute or subacute obstruction ultimately demanding medical aid. This group comprised 12 cases.

Group 4 comprised 16 cases in which genito-urinary symptoms dominated the clinical picture, and it was mainly on account of this that the patients sought advice. In 14 cases in the group, examination revealed a vesico-sigmoidal fistula. In 11 of the cases there was a history of bowel trouble previous to the onset of the genito-urinary symptoms. In three of the cases of vesico-sigmoidal fistula there was no history of preceding bowel trouble.

Group 5 comprised eigat cases in which malignant disease was associated with diverticulitis in the sigmoid. This figure must not be taken as reflecting the frequency with which malignant neoplasm and diverticulitis are associated; it is simply a series of cases in which pathological specimens were available. Clinically, this series divided itself into two subgroups, in the first of which there was a definite history of diverticulitis going back a year or two, and in the second the diverticulitis was mild or latent, and the symptoms were suggestive of carcinoma from the outset.

Group 6 comprised seven cases which could not strictly be placed in any of the other groups because of atypical features. Either there was no history of constipation, or diarrhœa was a feature. In one case constipation and diarrhœa alternated. Pain might, or might not, be present, but there was a tumour in the left lower quadrant. In view of the fact that constipation and obstruction have been emphasised as being the natural consequence of diverticulitis, this small group of atypical cases demonstrates that there may be exceptions in which the ordinary clinical manifestations of the disease are absent.

Clinical Features of the Acute Attack of Diverticulitis (Groups 1, 2, and 3).

The cases in these three groups, about 70 per cent. of the total, were characterised by constipation and one or more acute attacks, possessing certain distinctive features which constitute a syndrome of the lower left quadrant almost pathognomonic for diverticulitis.

An attack is usually preceded for a few days by a slight increase in the degree of constipation, slight bloating in the upper abdomen with belching, and often mild rolling gas pains in the lower abdomen of momentary duration. The onset of the acute stage is often precipitated by some form of purge, or by ingestion of rough or irritating food such as fruits or vegetables. Occasionally it appears to follow exertion or straining at stool. Severe colicky pain sets in, usually in the left lower quadrant. Sometimes at the outset the pain is generalised throughout the abdomen or distributed equally through both lower quadrants, but as a rule it finally settles down in the left lower quadrant, and if it is present in both lower quadrants it is always more pronounced on the left.

The *pain* is variously described as sharp, cutting, griping, or shooting, and may remain strictly localised to the left iliac fossa or may radiate over the crest of the ilium into the left side of the back, into the left groin and testicle, or, as in one instance, into the left knee. Radiation into both testicles was observed in one case in which the pain was present in both lower quadrants. The pain is often severe enough to double the patient up; at other times he will

bend over and press on the stomach for relief. This, however, is only at the outset, for if there is peritoneal involvement he finds greater comfort in complete rest. It is often severe enough to require morphine.

There is sometimes an initial chill, and then the temperature rises to 100° F. or higher. In 30 of the cases in which fever was present with acute attacks, it varied between 100° and 102°. Nausea is not infrequently present, and more rarely vomiting. Usually, however, as with appendicitis, the patient vomits once or twice only. The bowels remain obstinately constipated, no flatus is passed, and enemas administered for relief often return clear. Urinary symptoms are common. In 41 of the 100 cases examined there were symptoms referable to irritation of the bladder. Excluding for the moment the 14 cases of vesico-sigmoidal fistula which will be considered later, there still remained 27 cases in which the relationship of the acutely inflamed sigmoid to the bladder produced difficulty or inability to start the stream, urgency, frequency, nocturia, and burning pain sometimes at the beginning and sometimes at the end of micturition. In fact, some degree of vesical tenesmus is typical during an acute attack of diverticulitis. The patient frequently observes that, apart from urinary symptoms, pain is relieved when the bladder is empty.

On examination there is generalised abdominal distension, or localised fullness in the left lower quadrant. On palpation, the left iliac fossa is tender, but muscular rigidity, if present, is usually very slight. In the left iliac fossa an elongated tender tumour in the position of the sigmoid can usually be palpated. This tumour was present in 56 per cent. of the cases of surgical diverticulitis.

On account of the associated obesity, abdominal distension, and tenderness, this palpable mass in the left iliac fossa is usually best felt by the rectum or bimanually. It varies in size and shape from that of a hen's egg to that of an orange or lemon. It is smooth, partially fixed, and usually very tender. In consistency it is firm, rarely hard, and occasionally it has been mistaken for an abscess. Because of the mobile nature of the sigmoid and its tendency to form adhesions, the position of the mass, although almost invariably in the left lower quadrant, may vary somewhat. It may be accessible to the examining finger by rectum, or it may be high and far out in the left iliac fossa. Sometimes it is close in toward the median line, and may be palpated between the bladder and rectum. The most distinctive feature about the sigmoid tumour is its tendency to appear during the acute febrile period and to disappear in the intermission. The disappearance may not be complete, but there is always marked recession in size after the acute attack has passed. In some instances the patient has been the first to notice the tumour, and has not only seen the fluctuations in size during the acute attacks, but has also affirmed that the mass was larger during the present attack than during a preceding one.

An acute attack of diverticulitis may last from a few hours to two or three days. Occasionally it is prolonged for a week or more, or until relieved by operation. Defæcation usually gives marked relief, although it may be attended by considerable pain, and enemas, if persevered with, will usually relieve most of the discomfort. Occasionally slight diarrhœa may set in for a day or two, or an excessive amount of mucus may be passed. Pari passu with the relief of the abdominal distension the mass in the left lower quadrant becomes smaller and less tender, and may disappear entirely. During the acute period, from 10,000 to 20,000 leucocytes is a common finding. While it is true that in a considerable proportion of cases attacks of acute diverticulitis will abate if left alone, occasionally the obstructive symptoms are so alarming as to call for operation. In seven cases in the present series colostomy had been performed before examination at the Mayo Clinic.

Symptoms of Fistula (*Group* 4).—The symptoms referable to the development of fistula were either preceded by symptoms suggestive of a flare-up in the bowel condition or developed suddenly without any such warning. Often there was increasing constipation and intermittent pain in the left lower quadrant for a week or more. Impending perforation into the bladder was heralded by pain and tenderness immediately over the vesical area. Sometimes, however, dull and boring perineal pain was experienced for several days, and a degree or two of temperature was invariably present. Then an attack of urgent, burning, and painful micturition was accompanied by the passage of small grape-seed-like fæcal particles through the urethra and also audible gas at the end of micturition. The patient usually noticed that the urine was heavily loaded with sediment and had a fæcal odour. The passage of gas and fæces by urethra usually relieved the acute pain, but cystitis remained, resulting in urgency, frequency, and nocturia. These symptoms persisted intermittently, with occasional flaring-up of the cystitis, until relieved by operation.

Differential Diagnosis of Carcinoma (*Group* 5).—The clinical distinction between diverticulitis and carcinoma may be difficult. In fact, if carcinoma develops in a colon where there is diverticulitis, the differentiation may be well-nigh impossible, except by the pathologist, until the malignant process is advanced. Cramping pain in the left lower quadrant was usually present, but frequently burning and pain in the rectum was also complained of, and painful defæcation and tenesmus were associated features. It is true that in uncomplicated cases of diverticulitis tenesmus may occur, but it is rare, and though painful defæcation may immediately follow an acute attack, it is not present at other times. Pain and burning in the rectum are rarely met with in diverticulitis. Bleeding from the bowel is suggestive of carcinoma; it is rare in diverticulitis and, if it occurs, search ought to be made for hæmorrhoids, which are usually present as a result of the constipation. Mucus may be passed in both diverticulitis and carcinoma, but it is much commoner in the latter and is usually streaked with blood. In malignant disease pain, if present, may go through to the back, a very infrequent radiation in diverticulitis. There is usually loss of weight in both conditions. The barium enema may demonstrate a filling defect only. The sigmoidoscope will usually reveal carcinoma if the tumour is accessible, but it is rarely possible to diagnose diverticulitis in this manner.

TREATMENT.

Uncomplicated diverticula of the colon require no special treatment beyond controlling the constipation by appropriate measures which keep the diverticula of the sigmoid free, so far as possible, from the formation of hard concretions which are the precursors of inflammatory changes.

Even when inflammatory changes have taken place, the tendency is towards increasing conservatism in treatment; radical operations, implying extirpation of the affected portion of the intestine, are not to be undertaken lightly. Medical management, in a proportion of cases, not only tides the patient over an acute attack, but may even safeguard him against subsequent attacks. In severer cases, however, and when obstructive symptoms are urgent, surgical intervention may be necessary; the choice lies between colostomy, with the possibility of resection later, or resection without preliminary colostomy. The resection may take the form either of a Mikulicz operation, or an anterior tube resection of the Balfour type. In the present series, a Mikulicz resection was performed in 42 cases; in 21 an anterior tube resection was performed by the Balfour method, either with or without preliminary colostomy; in eight colostomy alone was performed. The surgical procedures carried out in the remaining cases included local excision of diverticula, resection of a portion of the circumference of the intestine, plastic closure of vesico-sigmoidal fistulæ, and short-circuiting operations to relieve obstruction.

There was a mortality of 10 per cent. Most of the remaining patients, traced for years, were relieved, but a few still had some constipation which, however, was readily controlled by paraffin.

(*Bibliography at foot of next page.*)

THE TREATMENT OF DIPHTHERIA CARRIERS.

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THE carriers from all the Metropolitan Asylums Board Infectious Diseases Hospitals were collected together in the North-Eastern Hospital and made the subject of an extensive investigation, of which the primary object was to discover why some patients should continue to harbour diphtheria bacilli for prolonged periods after convalescence from an attack of clinical diphtheria. This part of the investigation took a considerable time to complete, and the findings obtained therefrom have been published by Thomson, Mann, McCartney, and Harvey [1] in the Annual Report of the Metropolitan Asylums Board for 1926–27. The presence of pathological conditions or physical abnormalities in the nose, nasopharynx, or throat was found to be the main predisposing factor in inducing or sustaining the carrier state. It also appeared that the diphtheria bacilli were living an extra-corporeal or saprophytic existence in the inflammatory products present along with these abnormalities, and were not existing actually in living tissues. It followed from this that the correction of such abnormalities as enlarged turbinates, deflected septa, with crusting of the nasal mucosa and nasal discharge, and septic and ragged tonsils, ought to go a long way towards curing the carrier condition. The methods of treatment used in the investigation had therefore this object in view. The cases were all "chronic carriers," that is, people who had harboured true virulent diphtheria bacilli for a period of at least 12 weeks. This definition of a carrier, though arbitrary, was important, since it implied that the infection was not merely a transient one.

Criterion of Cure.

It was the practice at the North-Eastern Hospital to take cultures from each patient once a week, and only to regard a carrier as free from infection when six consecutive negative cultures were obtained. Very many cases, after yielding negative cultures for three, four, or even five weeks, became positive once more and remained so for prolonged periods. It is always wise to have the cultures taken by someone competent to do so, preferably the person who is to examine them. Thus at the North-Eastern Hospital all the carriers were cultured personally and were not regarded as "free from infection" until six weekly negative cultures had been obtained.

The Throat Carrier.

The carrier with bacilli in the throat only does not appear to present any difficulties of treatment. Removal of the tonsils as first advocated by Pegler,[2] or of the tonsils and adenoids, gives very satisfactory results.

At the North-Eastern Hospital 60 cases were treated by the removal of tonsils and adenoids, the operations being performed by Mr. Humphrey Marriner. Of these 60 cases 17 harboured bacilli in the throat only, and of the 17 cases 16 were cured. The remaining 43 cases had bacilli in the nose or ear as well as in the throat, and of these 19 were cured. It was noted that the percentage of "cures" decreased in direct proportion to the extent to which the nose cultures were positive. Nine patients who were operated upon because of large and unhealthy tonsils and of intermittently positive cultures showed the Klebs-Löffler bacilli in the crypts of the tonsils removed at operation, although the preceding cultures had been negative. Four nurses who harboured diphtheria bacilli in the throat had their tonsils removed before the end of the 12 weeks period which would have made them officially chronic carriers. In each case a cure resulted.

It will thus be seen that if the bacilli are confined to the throat the likelihood of a cure from removal of the tonsils and adenoids is great. The optimum time for the operation seems to be earlier than is usually advised. If the throat cultures remain persistently positive, and if the tonsils show any evidence of being the site of an inflammatory process, they should be removed six to eight weeks after the onset of the infection. The tonsils removed at operation were examined culturally and by section for the presence of diphtheria bacilli, which were present in the tonsils and adenoids in 61 per cent. of cases. It was evident that the tonsil likely to harbour diphtheria bacilli was not the large, clean tonsil, but the small, ragged, septic one with deep crypts. It was usually possible to foretell by clinical examination the tonsil which, on removal, would yield diphtheria bacilli on culture. In 1917 H. Stévenin,[3] and in 1921 G. H. Weaver,[4] drew attention to the fact that an attack of follicular tonsillitis in a carrier freed the carrier from infection. A. Schiotz,[5] in 1919, suggested that this observation might be applied practically by spraying the throat with living staphylococci and thus inducing an attack of tonsillitis. This method has not been tried during the present investigation, but several of the carriers in this series contracted severe tonsillitis and, although the Klebs-Löffler bacillus disappeared temporarily from the throat, it invariably returned when the acute stage of the tonsillitis had subsided.

The Nose Carrier.

Nasal carriers of diphtheria are very refractory. A constant feature is the presence of rhinitis, which may take the form of a watery or purulent discharge, or of extensive crusting round the anterior nares, sufficient in some cases to obstruct the breathing. The great majority of chronic carriers have diphtheria bacilli in the nose. Various methods of treatment have been suggested from time to time, but none has

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proved completely efficient. Local application of antiseptics to the mucous membrane has never been accepted as a completely satisfactory means of treatment. Vaccines have been used by various workers,[6 7 8 9] who claim more or less satisfactory results.

At the North-Eastern Fever Hospital 38 chronic and persistently positive carriers were treated by vaccines of the organisms, other than diphtheria bacilli, present in the nose. Only in three cases were the vaccines composed solely of Klebs-Löffler bacilli. They were all autogenous. The abnormal condition of the nose was ascribed to the presence of pyogenic organisms, rather than to the diphtheria bacillus, and it was therefore hoped that, if the former were removed by autogenous vaccines, the condition of the nose would improve and the diphtheria bacilli would no longer obtain a pabulum for growth. The organisms included staphylococci (albus and aureus), pneumococci, and hæmolytic streptococci. The results were only moderately satisfactory. Of the 38 cases treated 16 cleared up after one to nine weeks. The remaining 22 cases remained positive, although some of them improved. Material from the noses of the carriers treated was inoculated on to blood-agar plates, and it was found that all the organisms from which the vaccines had been prepared had disappeared from the noses, except the staphylococci. In view of this fact a further course of treatment was sought which might be effective in clearing the ubiquitous staphylococcus from the nasal passages. This treatment took the form of a mildly alkaline nasal douche, made up as follows: sodium bicarbonate, sodium chloride, sodium biborate, aa. ʒij. to water ℥xx., i.e., about 2 grains of each per oz. of water. This stock solution was diluted for use with equal parts of warm water, and the noses were douched night and morning, the solution being allowed to run into the nose and out of the mouth by gravity. In some cases a small quantity of hydrogen peroxide (about one drachm per pint) was added to the solution to soften crusts around the nares.

The results of nasal douching were very satisfactory. Crusting and rhinitis were greatly lessened, and nasal discharge usually diminished or ceased altogether. The nasal mucous membrane became pink and healthy and altogether the condition of the nose was greatly improved. Material from the noses of the carriers thus treated was inoculated as before on to blood-agar plates, and the noses which before treatment had yielded an abundant flora were now found to be practically sterile. Moreover, although the former flora usually returned almost immediately when the douching was discontinued, the diphtheria bacilli did not do so in a large proportion of the cases.

In all 62 cases were treated. In 7 treatment had to be stopped owing to the refractory behaviour of the children. Of the remaining 55 cases 27 cleared up in from one to seven weeks. Eight cases cleared up after one relapse, and a further 8 cases cleared up after a second course of treatment. The treatment had no effect in 12 cases. Most of the children behaved quite well when being douched, and those who showed any nervousness quietened down after a short time. This form of treatment is inexpensive and easily carried out. The procedure adopted was to continue the douching until three negative cultures had been obtained at weekly intervals. Douching was then discontinued, and the carrier was discharged after a further three negative cultures, taken at weekly intervals. Thus any doubt that the negative cultures might have been due to the douching was removed. The youngest child treated was 8 months old. The complete results were:—

		Per cent.
Total cases treated	62	
Cases in which treatment had to be stopped	7	
Actual cases treated	55	
Cases cured after one course of treatment	27	= 49
,, two courses ,,	8	= 14·5
,, one relapse	8	= 14·5
Total number of cures	43	= 78
Total number of failures	12	= 22

The results obtained from douching were even better than they appear, since the carriers chosen for treatment were mostly cases who were persistently and strongly positive and who had failed to clear up after undergoing various other forms of treatment.

A method of spraying the nose with an alkaline spray was tried, but the results were unsatisfactory.

A small series of cases was treated by autogenous vaccines, together with daily nasal douching. The results in 9 cases were that 3 cleared up immediately treatment was commenced; 3 ceased to carry virulent Klebs-Löffler bacilli, but were found to be harbouring non-virulent organisms; 1 cleared up after two vaccines; and 1 failed to clear up.

A 1 per cent. solution of iodine oil was applied to the noses of four carriers. Of these three cleared up, while the other failed to do so. There was some evidence, however, that the cases were clearing up before treatment commenced, and as this form of treatment had previously been found of no avail, it was not continued.

Antrum and Adenoid Investigation.

When cases fail to clear up after vaccines and nasal douching, the antrum of Highmore was suspected as the source of the bacilli. The antrum was opened and explored in three cases. Diphtheria bacilli were isolated from it in two cases, under circumstances which excluded contamination, while in the third case the examination revealed no growth. The antrum was thoroughly cleaned out in one of the patients, and the case cleared up with the help of nasal douching. It is usually very difficult to operate upon the antra of a young child, and permission may be refused. X ray photographs are of little, if any, help. The antrum, however, should be kept in mind as a last resort in the investigation of very persistent nose carriers.

Sixteen carriers were operated upon, principally to see the effect of the removal of the adenoids upon the carrier state. In no case, however, were the adenoids removed without the tonsils, as the latter always showed sufficient evidence of abnormality or definite disease to warrant their removal. All cases chosen had strongly positive nose cultures; three of them were cured, and diphtheria bacilli were isolated from the adenoids in two of these. Removal of the adenoids does not seem to be effective in the treatment of nose carriers.

The Ear Carrier.

The treatment of ear carriers is extremely difficult. No satisfactory form of treatment was discovered. The discharge often ceased altogether for several weeks and then, without any apparent cause, began again. The commonest method of treatment was to instil hydrogen peroxide and alcohol drops into the ear. Cases were treated by vaccines, removal of tonsils and adenoids, mastoidectomy, and nasal douching. The results were as follows:—

	Cures.	No effect.	Total.
Removal of tonsils and adenoids	3	3	6
Vaccines (consisting of organisms isolated from the nose)	2	1	3
Nasal douching	3	1	4
Mastoidectomy	1	1	2
			15

Many so-called "carriers" were admitted to the North-Eastern Hospital on suspicion of harbouring diphtheria bacilli in the ear, but the bacilli were really saccharose-fermenting diphtheroids, and not true virulent Klebs-Löffler bacilli. Since these carriers are so intractable it is fortunate that the presence of virulent diphtheria bacilli in discharge from the ear is uncommon.

Results of Various Forms of Treatment.

Form of treatment.	No. of cases treated.	No. (and per cent.) of *immediate* cures.	No. (and per cent.) of *delayed* cures.*	Total No. (and per cent.) of cures.	No. (and per cent.) of failures.
Vaccines	38	10 (26·4)	6 (15·7)	16 (42·1)	22 (57·9)
Nasal douching	55	23 (41·8)	20 (36·2)	43 (78)	12 (22·2)
Vaccines and nasal douching combined	7	3 (42·9)	1 (14·2)	4 (57·1)	3 (42·9)
Removal of tonsils and adenoids	60	33 (55)	2 (3·3)	35 (58·3)	25 (41·7)

* Over three weeks and including relapses and cases in which a second course of treatment was necessary.

It should be noted that the cases chosen for treatment were the most persistent and chronic carriers obtainable.

In addition to the specific methods general hygienic methods were always adopted in an endeavour to improve the health of the carriers. It was found, however, that the general health was usually extremely good, and this factor seems to have little if anything to do with the duration of the carrier condition. Exposure to carbon arc radiation was tried, but appeared to have little effect.

Conclusions.

1. The most important carrier is the one who harbours diphtheria bacilli in the nose.

2. The only satisfactory form of treatment for the nose carrier tried during the investigation was douching with a mildly alkaline nasal douche. Properly carried out this yields excellent results.

3. Tonsillectomy yields very satisfactory results in carriers whose bacilli are confined to the throat.

4. The ear carrier, happily uncommon, is very difficult indeed to deal with, and does not respond readily to treatment.

5. The treatment of diphtheria carriers should mainly consist in rectifying local abnormalities and pathological conditions responsible for the carrier state. If this is done properly the coexistent abundant flora will be diminished, and the diphtheria bacillus will probably disappear also.

6. Diphtheria carriers should be treated as early during convalescence as is compatible with safety, always bearing in mind the likelihood of diphtheria complications. The longer the bacilli are allowed to remain in the infected area the more difficult does their removal become. In addition, apart from the loss of education to the children, the burdens which diphtheria carriers lay upon the finances of the various public health bodies make the necessity for their early treatment and cure a very important consideration.

I wish to thank Dr. F. H. Thomson, medical superintendent of the North-Eastern Hospital, and Dr. J. E. McCartney, director of research and pathological services to the Metropolitan Asylums Board, for their unfailing courtesy and assistance throughout the investigation.

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CARDIAC INFARCTION WITHOUT PAIN.

A SERIES OF EIGHT CASES.

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ALTHOUGH the syndrome of cardiac infarction with prolonged anginal pain is now well recognised, few cases have been recorded of infarction without pain. We have recently seen seven cases where the patient was able to refer the beginning of his illness to a particular day on account of the sudden onset of severe dyspnœa, but this was completely free from pain.

CASE 1.—A police sergeant, aged 57, enjoyed good health until February, 1926, when he suffered from an attack of "influenza" characterised by dyspnœa and giddiness. He recovered completely from this and, save for a slight degree of shortness of breath when bicycling, his health remained perfectly normal during the rest of the year. On June 29th, 1927, he "caught a cold," and was confined to bed on account of great dyspnœa and a severe cough. He recovered rapidly, but the dyspnœa persisted and became more troublesome, so that he experienced considerable difficulty in walking even on the level, and required four pillows for comfort at night. During the last three weeks he had noticed that he was passing less urine. He had not had any pain.

Examination on Jan. 17th, 1928, showed a large heavily built man who appeared distinctly pale. The pulse was 134 and regular. The arteries were not thick; blood pressure 140/90. The apex of the heart was in the sixth space and 1 inch external to the nipple. The impulse was moderately heaving in character. The first sound at the apex was short and was reduplicated from the nipple line to the sternum. There were no murmurs. There was no œdema; the liver was not enlarged, and the lung bases were clear. The urine contained no albumin. The Wassermann reaction of the blood serum was negative. The electrocardiogram showed a left-sided preponderance.

He was put to bed and given digitalis, ℿxx., four times daily for eight days, followed by ℿxxx. daily. During this period his pulse fell to 80, and his urine output increased from 20 oz. before treatment to an average of 40 oz. All trace of the reduplication disappeared. On Feb. 10th he died suddenly in bed.

Post-mortem Examination.—The right side of the heart was engorged with blood, but appeared healthy. All the valves were normal. The cavity of the left ventricle was considerably reduced by the presence of ante-mortem clot, which was firmly adherent to the cardiac wall. This clot was distributed in two irregular areas, the first and larger of which involved the apex, while the second started posteriorly in the region of the papillæ of the mitral valve, and traversed the ventricle horizontally, ending near the interventricular septum. Corresponding to this distribution of the clot there was extensive disease of the muscular wall. At the apex it was almost wholly replaced by dense white fibrous tissue, so that only a thin strip remained on the pericardial surface. In the second area fibrosis was not so advanced, but was evident as a belt encircling the ventricle. Histological section showed that the clot was firmly organised to a thickened endocardium. The proximal 2 inches of both coronary arteries were thickened, atheromatous, and partly calcareous. The left contained a strip of active ulceration and destruction of the intima. There was complete occlusion of the following vessels: (1) a large branch of the left coronary, descending in the anterior interventricular sulcus to the apex, and a small branch of this supplying an area in the region of the interventricular septum; (2) two large branches of the right coronary, from a clot lodged at their bifurcation, supplying the posterior wall of the ventricle and extending round to the anterior surface as far as the interventricular septum. This was an abnormal distribution, since this area is usually supplied by the circumflex branch of the left coronary. Sections of the four occluded arteries showed a trace of lumen in each. In two of these multiple channels could be seen. The cellular structure of the tissues occluding the vessels suggested organised clot rather than inflammatory endarteritis, so that it appeared as if partial recanalisation had occurred (Fig. 1).

CASE 2.—A male, aged 51, a patient of Dr. Williamson, had enjoyed good health until December, 1927, when he "caught a cold" after a strenuous day. For this he had to go to bed for a few days as he was so short of breath; and during this time his ankles were swollen and he had a troublesome cough. He recovered rapidly, but his dyspnœa persisted so that he has not felt quite right since. On Feb. 7th he spent the day motoring, and caught a further "cold," which kept him in bed till the time of examination. He had the same symptoms as before, with the addition of some tightness at the lower end of the sternum, which he attributed to coughing.

Examination on Feb. 17th, 1928, showed a large man who appeared rather pale. His arteries were only moderately thickened; blood pressure 160/110. The pulse was 100 and irregular from frequent extrasystoles. The apex of the heart was in the sixth space and external to the nipple, and the impulse was slapping in character. The second sound was reduplicated from the apex to the sternum. There were no murmurs. Œdema was present over both ankles, and crepitations could be heard at both bases. A polygram (Fig. 3) showed a low-tension pulse with a moderately persisting alternation, and ventricular extrasystoles.

Ten days later he had symptoms of infarction in the lungs, with pain in the right side of the chest and hæmoptysis. He recovered from this, and is now free from all signs of heart failure.

Although post-mortem evidence of infarction is lacking, his condition was so exactly comparable to the other cases that it can hardly be doubted that he has one or probably two infarcts in his myocardium.

CASE 3.—A man, aged 54, a patient of Dr. Hinsley Walker. Four years ago, after rapidly mounting two flights of stairs to his room, he grasped the bed rail and fell on his back with his "face working." A doctor pronounced the condition to be a faint and kept him in bed the next day. Since that time he has been in good health, but he noticed he could not manage the long walks he used to take, as he became short of breath. During the last six months he has had a cough and some nocturnal attacks of dyspnœa, with tightness round the lower part of the chest. Deep cyanosis had been noticed when he was turned on his left side to reduce prolapsed hæmorrhoids.

Examination on Feb. 28th, 1928, showed a big man whose face was cyanosed. His pulse was 120, and his blood pressure was 160/110, but these readings must be discounted to a certain extent, since the patient was apprehensive. The radial artery was impalpable. The apex of the heart was half an inch outside the nipple line. The first sound at the apex was replaced by a systolic murmur which was

FIG. 1 (Case 1).

Section of terminal anterior branch of left coronary artery, showing recanalisation in granulation tissue of organised thrombus.

conducted out to the axilla. The second sound and the sounds at the base were normal. The lungs were normal except for a few rhonchi posteriorly. The liver was not palpable and there was no œdema.

A fortnight later he had a hæmoptysis and became feverish. Three days after he died suddenly.

Post-mortem Examination.—Both auricles and the left ventricle of the heart were much enlarged. There was no valvular disease, but the mitral orifice was greatly dilated. The anterior surface of the left ventricle near the apex was firmly adherent to the pericardium by a dense fibrous strand with an area of attachment of about 1¼ inches in diameter. This area formed the apex of a spherical aneurysm of the ventricle approximately 2 inches in diameter. The wall of the aneurysm was thin and calcareous, and contained little muscular tissue. The lining endocardium was yellow, thickened, calcareous, and partly ruptured by ulceration. The left coronary was in a condition of advanced atheroma throughout its course, with ulceration and calcification. The main branch, descending along the anterior interventricular sulcus, was completely obliterated by old organised tissue. The terminal portion of this branch was patent but collapsed. The right coronary was normal except for some ulcerative atheroma in its proximal portion. At the apex of the left lung there was a necrotic area where the lung was firm and solid. On section all this area was seen to be involved in an acute necrosis which was breaking down into pus. The main branch of the pulmonary artery supplying the apical region was plugged with a thrombus for about one inch, and the thrombus had extended into the branch supplying the remainder of the upper lobe where the lung had a normal appearance. There was a bilateral pleural effusion, some ascites, and a nutmeg liver.

The patient appeared to have had two pulmonary infarcts. The first caused the hæmoptysis and the lung abscess, while the second was followed by sudden death.

CASE 4.—A man of 63 was in good health until July, 1926, when he had a sudden and severe attack of dyspnœa, which obliged him to keep to his bed for two months. He

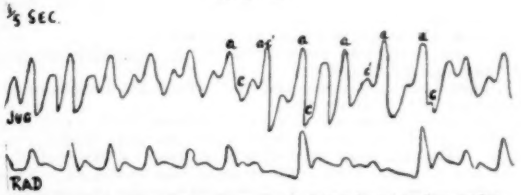
FIG. 2 (Case 1).

Slice of left ventricle in lateral plane, showing two main areas of fibrosis: (1) apex; (2) middle transverse zone cut at two points.

recovered to a certain extent, but could never go back to his work, and a year later he was admitted to King's College Hospital. He had not had any pain.

On examination he was slightly cyanosed and the legs and lower part of the body were swollen. The pulse was irregular from extrasystoles. The blood pressure was 162/116, and the radial artery was thick. The apex-beat was almost imperceptible, but the heart appeared to be enlarged in both directions. The first sound at the apex was reduplicated, and there were soft systolic murmurs in the mitral and tricuspid areas. The liver was large and tender. The urine contained albumin, and the blood-urea was high, 145 mg. per 100 c.cm. The electrocardiogram showed a left-sided preponderance with an inverted T wave in lead I, and a flattened T in lead II. The P.R. interval was increased to 0·24 of a second. Extrasystoles were present, arising from the right ventricle and from an inter-

FIG. 3.



Polygraph tracing from Case 2, showing low-tension pulse, alternation, and ventricular extrasystoles.

mediate focus near the septum. For a time he improved under treatment, but later heart failure supervened, and he died 15 months after his initial attack.

Post-mortem Examination.—The heart was very large; on the anterior aspect of the left ventricle near the apex the pericardium was adherent to the chest wall. Corresponding to this was an area of fibrosis in the ventricle where the muscular wall was thin. This extended into the adjacent part of the right ventricle and into the lower and anterior part of the septum, and was continuous with a mural thrombus which was firmly attached to it. Inside the right ventricle was a recent thrombus, and there were some infarcts in the lungs. The anterior descending branch of the left coronary artery was in a state of advanced atheroma, but the main channel seemed to be patent as though it were recanalised. Microscopical section of the infarct showed that the muscle was replaced by fibrous tissue and that the small arterioles were obliterated by overgrowth of their intimal coats.

CASE 5.—A man, aged 52, had a sudden and severe attack of shortness of breath in September, 1926. He had previously enjoyed good health. This dyspnœa affected him apart from exertion, and he was completely incapacitated. At the same time a troublesome cough developed, and he experienced paroxysmal attacks which he called asthma. After about a month he recovered sufficiently to be able to work a little in a warehouse. He soon had to give up, however, and came into hospital. At no time had he had any pain in the chest.

On admission he was orthopnœic and pale, with a little cyanosis. The pulse was irregular from frequent extra systoles, the radial was moderately thick, and the blood pressure 140/90. The heart was considerably enlarged, and the apex beat was wavy. There was reduplication of the first sound at the apex, and an apical systolic murmur. The jugular veins were full, the liver was large and tender, and the ankles were swollen. The electrocardiogram showed left bundle branch block with premature beats arising in the left ventricle. The Wassermann reaction was negative.

During two months in hospital on digitalis and diuretin he improved considerably. Heart failure recurred, however, and he died suddenly in hospital 11 months after his original attack.

Post-mortem Examination.—The heart weighed 750 g. All the chambers were dilated and the walls of the ventricles were abnormally thick. Under the posterior flap of the mitral valve the endocardium was thickened, and the trabeculæ were thin and atrophic. The posterior papillary muscles were wasted. Fibrous tissue replaced the muscle for a depth of 2 mm. This area of fibrosis involved the upper part of the posterior wall of the left ventricle and extended forwards into the posterior part of the interventricular septum so that it encroached upon the left branch of the bundle of His. The coronary arteries were calcified in places, the circumflex branch of the left coronary and the posterior part of the right being the most severely affected. Both arteries, however, had their main channels patent. There was a patch of thickened pericardium over the area of infarction at the back of the left ventricle.

CASE 6.—A man, aged 41, had an attack of breathlessness when walking in the street. He was quite overcome and had to keep to his bed after it for some days. After a little he recovered fairly well and was able to get about again. Then gradually the breathlessness on the least exertion came back. When seen he was obviously far gone in heart failure. The condition was in striking contrast to his appearance eight months before, when he had been successfully treated for gastric ulcer. The heart was greatly enlarged, with a wavy, heaving apex-beat. A clear gallop rhythm, due to reduplication of the mitral first sound, could be heard at the apex. There was severe venous engorgement. Under treatment with large doses of digitalis he got rather better and insisted on leaving hospital. In a month he was back with thrombosis of the right subclavian and jugular veins, and his heart was worse than ever. On this occasion it was possible to take an electrocardiogram. This showed small complexes in all leads, absence of the T wave in the first lead, with very small indefinite T waves in the other two. Frequent extrasystoles came from several foci in both ventricles.

The Wassermann reaction was negative.

The diagnosis was thrombosis of the coronary arteries and myocardial infarction.

He gradually got worse and died, about six months after the onset of the symptoms.

Post mortem there was a very large heart with a patch of thickening of the pericardium over the left ventricle in front. Here the wall was very thin, and on opening the chamber a large area of infarction was revealed. This involved most of the front of the left surface of the interventricular septum and a good deal of the front of the left ventricle itself. The descending branch of the left coronary artery was blocked by an old thrombus just at its origin. At this point there was a small atheromatous patch. The obstruction was not more than a centimetre long, and obviously canalised, as it was easy to demonstrate that blood could be squeezed through small holes in the obstruction. Elsewhere there was very little atheroma. The changes of chronic venous engorgement were intense. The right subclavian and innominate veins were thrombosed, and there were sundry infarcts in the lungs.

CASE 7.—A professional man of 68 was walking in his garden when a sudden shortness of breath overcame him, so that he collapsed and seemed for the time as though dying. Before this he had been active and had played golf a good deal, doing rather more than usual for his age. After the attack he could not leave his bed. The dyspnœa continued so that he had to keep sitting up, and was really most comfortable in a chair. When seen a fortnight after the attack he looked blue, the legs were swollen, and the liver large. The heart beat at 84, with many extrasystoles. The radial was rather tortuous, the blood pressure 125/70. Over the heart, which was a good deal enlarged to the left, the mitral first sound was faint, and then reduplicated, so that a gallop rhythm was heard. Under fairly large doses of digitalis and diuretin he made progress and is now a good deal better.

There can be little doubt that in this case myocardial infarction led to this sudden and severe failure of the heart, the chief symptom of which was dyspnœa, without anginal pain at any time.

CASE 8.—A business man of 65 felt rather cold one evening, and retired to bed. When lying quietly, talking, he suddenly sat up with a cry, and fell back dead. Before this he had not been looking well for some months, and for the last five months had complained of getting tired very easily. Every day he had walked up a considerable hill on his return from business. Angina he had never had, neither was he troubled with dyspnœa to any degree. He had not consulted a doctor for five years.

Post mortem there was an area of infarction in the upper part of the front of the left ventricle. It was old and well organised, and had evidently been there for months. Thrombosis had occurred in the descending branch of the left coronary artery, but small canaliculi were easily seen in the obstruction where the thrombus had been. The heart was very large, 26 oz., with dilated capacious chambers. In the aorta there was much soft atheroma, the radial was thick and tortuous, and the kidneys rather granular. It is probable that he had high blood pressure. The striking point here is the negative history, there being neither angina nor dyspnœa coming in an attack, nor the gradual onset of heart failure. Yet the lesion was a large one, of some considerable standing.

Discussion.

Parkinson and Bedford,[1] in their account of cardiac infarction, include a type with dyspnœa and failure but without pain, which may be found when infarction supervenes in a patient with pre-existing signs and symptoms of heart failure. Two out of their 100 cases were of this type. Gibson,[2] out of 43 cases verified by post-mortem examination collected from the literature, has a group of six patients with chronic heart failure in whom dyspnœa was a prominent symptom. J. Cowan, quoted by Gibson, referred to two cases in which there was a sudden onset of dyspnœa, but in one there was a coexisting parenchymatous nephritis, while the other subsequently developed pain. Coombs [3] had a case in which there was a sudden onset thought to be due to influenza, and death occurred in three months from heart failure. Wearn,[4] on the other hand, found dyspnœa to be prominent in 16 out of the 19 cases of infarction studied by him. It was the predominant sign and chief complaint in four of these patients who had no previous signs of cardiac failure, and was so severe that it was out of proportion to the other findings in the heart and lungs.

Six of our cases are clinically very similar. They all had a sudden attack of severe dyspnœa associated with heart failure. Recovery from this illness took place to a greater or lesser extent, but in no case was the patient ever the same as he was before the attack. In three the recovery was rapid and fairly complete; in the others it was the prelude only to a slowly progressive and fatal heart failure. The physical signs were such as have been described after cardiac infarction accompanied by pain. There was enlargement of the heart to the left, and a form of gallop rhythm at the apex. Five cases had frequent extrasystoles. In three instances the electrocardiogram showed that they were arising from the region of the heart in which the infarct was subsequently found. In the third case the polygram demonstrated the presence of pulsus alternans. Case 3 was seen four years after the probable date of his initial attack, at a time when he was not suffering from any cardiac embarrassment; his death was not primarily due to heart failure.

It appears, therefore, that cardiac infarction may occur in an apparently healthy individual, entirely unaccompanied by pain. It should be suspected as the cause of an attack characterised by the sudden onset of severe dyspnœa with heart failure, when no other reason can be found. The signs of failure may

disappear fairly soon, but some permanent disability is always left.

We are much indebted to Dr. F. B. Smith, pathologist to the Harrogate Infirmary, for the post-mortem notes of Cases 1 and 3, and for his care in preparing the photographs; and to Dr. Raymond Crawfurd for permission to include Case 4.

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RADIOLOGY AND SURGERY IN CANCER OF THE BREAST

AND IN "CHRONIC MASTITIS."

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ANALYSIS of 600 cases of breast cancer, treated with X rays or radium, and 60 cases of "chronic mastitis," treated with X rays, suggests that both in the prevention and cure of cancer of the breast radiological measures could be employed with advantage much more extensively than they are at present. Their use is almost entirely restricted now to practically hopeless patients with inoperable primary or recurrent disease, as it was for so long in cancer of the uterus, and there is little recognition of the unique effect of radiation (1) in rendering cases on the borderline of operability operable, (2) in sterilising the operation area so that so-called "recurrences" are less likely to take place, (3) in being a complete method in itself leading to cure in a proportion of early and even advanced stages of breast cancer, and (4) in its almost invariable success in the precancerous "chronic mastitis."

"Recurrence" and Preoperative Radiation.

If in all clinically early patients the malignant disease were localised in the breast substance, the percentage of surgical success would be 100 per cent. That the results as a whole are much poorer than this shows that in no given patient can the limitation to the breast be affirmed with absolute certainty. John Fraser has shown with whole-breast sections what widespread changes may occur with a small apparently early tumour; and for many patients we must fear, as Sir Lenthal Cheatle has said, that "when a lump appears in carcinoma the disease is well advanced."

When the second stage with palpable axillary nodes is reached, we may only reasonably expect from purely surgical intervention a 1 in 25 chance of saving life. Many sets of statistics support this conclusion of James Ewing. In these more advanced cases life may be prolonged for many years by surgical measures, but surgical statistics do not show what happens in the large proportion of interventions in which operation is incomplete. If the operation is gravely incomplete it may be followed by rapid widespread local or general recurrences within a few months, as I have seen in about ten patients who had had no radiation. It is such patients that suggest that there may be a "growth-restraint" exercised by the primary focus, the removal of which, with its possible growth-restraining hormones, leads to rapid new growth in the residue of cells. Alternatively these cases suggest that the knife, cutting across infected tissues and setting free live cancer cells, has stimulated their growth-activity—as incision is one of the best means of stimulating an animal tumour's growth (W. E. Gye). (Claude Regaud and James Heyman have shown in the tongue and cervix respectively that diagnostic incisions are contraindicated, as they make the end-results worse.)

In view of the large body of pathological and clinical evidence as to the partial or complete sterilising effect of radiation on malignant cells, a widespread preoperative use might well be made of X rays or radium to sterilise the operation field as far as is practicable. Very little advantage has, however, been taken of this means, which seems not far from ideal for the purpose. All that I have been able to find advanced in opposition to a general use of preoperative radiation is (1) that it is an uncertain and insufficient measure (F. C. Wood is against it because, on the basis of some animal experiments and contrary to a vast body of clinical experience, he asserts that a four or five skin-erythema dose is necessary to destroy breast cancer cells); (2) that its use delays the healing of the skin incision—N. S. Finzi has noted cases where this has happened; and (3) that radiation may stimulate the growth, as Sir Holburt Waring concludes from one case where a patchy redness and skin nodules appeared a fortnight after one X ray application. But the very existence of a stimulation dose is wholly denied by many radiologists of great experience (Guido Holzknecht, Heyman). A moderate surface application should not interfere with the healing of well-nourished skin-flaps, as has been shown by several of my own preoperative cases. While surface radiation cannot be relied on to cure with one application or set of applications a large tumour occupying most of the breast substance, it can be relied on with a great measure of probability to render no longer viable isolated groups of cells in lymph nodes and channels, and, in short, to sterilise the dangerous outlying field of the operation, when a movable small breast tumour has not already advanced beyond the early stage of axillary invasion. I have had about ten preoperative patients whose operation took place from three days to some months after the X ray application; in none of them was there faulty skin-healing of the scar. The cases were clinically so diverse that it is difficult to draw more conclusions than that (1) operation-scar healing is not delayed when the dose is adequate but not excessive; (2) some Stage I.–II. cases show three-year freedom from recurrence with preoperative and no post-operative radiation; and (3) some Stage II.–III. cases were made operable, and showed no local recurrence, although some died of metastases.

B. J. Lee and R. E. Herendeen have reported results with 92 patients showing the percentages alive and well in three years: after surgery alone, 24 per cent.; after post-operative radiation, 39 per cent.; and in those who had both pre- and post-operative radiation, 52 per cent. This illustrates the advantages of a combined method over surgical removal alone. They advise operation three or four weeks after the X rays; if it is performed earlier there may be hyperæmia. Neumann, F. Sluys and Coryn report good results from a rather similar combined technique (40 cases).

Radiation after Recurrence.

When "recurrence" has taken place, the results of X ray or radium treatment differ greatly according to the factors (some still undetermined) of site, type of growth, state of the patient, and method of radiation employed. The earliest noted "recurrences," those of pea or millet-seed size in or near the line of the scar, almost invariably disappear after surface X rays or radium. Larger nodes frequently become no longer palpable, or leave a small residue, after surface radiation with or without buried radium. My three-year "cure" of major recurrences, mostly supraclavicular or intercostal, on 165 cases with deep X rays or radium, is 22 per cent. One illustrative case may be summarised:—

CASE 1.—Aged 46; radical operation elsewhere, June, 1923. No post-operative X rays. By October, 1924, a massive scar recurrence, roughly 4 by 2 inches, and a ¼ inch thick, a nodule close to the sternum, glands in both axillæ, and in the right supraclavicular triangle. One high-voltage X ray course over these areas, followed on the scar area by a well-marked reaction, Grade I. All signs of disease disappeared after this, and the patient remains in good health. As prophylactic, a gland in the opposite axilla was treated in August and October, 1926, and a doubtful recurrence, a small tender right supraclavicular gland, was treated in October, 1927. There is now no sign of disease.

For patients with as widespread recurrence as this, X ray treatment is the more suitable. For a localised recurrence, for example in one supraclavicular triangle, half a gramme and upwards of radium element has been applied in a number of patients externally. The best results appear when the radium has been applied for suberythematous doses from 6 centimetres' distance in a "double-strength" intensity. Where a change is made from radium to X rays or vice versa, owing to an insufficient result, care must be taken not to overdose, as skin damage may result, with consequent bacterial infection and renewed growth of the residue. In no breast case has lung induration or severe blood damage been a result of treatment.

Post-operative Radiation.

Because in any given patient an incomplete operation may have been performed, some surgeons make a practice of referring patients for a "prophylactic" course of X rays. Analysis of 208 cases shows what wide variations there are in the state of the patient at the time of operation, the clinical and histological type of the growth, the method of operation, and other factors. It is safe to say that local scar recurrence can be almost completely abolished when patients have a post-operative course of X rays beginning within three or four weeks at latest after the operation. But in a considerable number of patients referred later than that, and in nearly a third of all this post-operative series, early signs of local recurrence in or near the scar, or in the axillary, parasternal, or supraclavicular glands, have been found when they were examined every six or eight weeks in the following year or two years. This shows the high proportion of incomplete operations, and the need for repeated examinations in the years following operation. If this were done in all patients after operations for malignant disease the end-results would be much better, for in almost every one of these breast cases, where definite or suspicious recurrences were noted at their earliest stage, further and more active radiation to that area has been followed by the disappearance of all signs of disease. The most lamentable cases seen, perhaps, by radiologists are those where breast or cervical operations have been followed by massive and practically hopeless recurrences; had the condition been recognised months before they would almost certainly have been curable.

Where the operability rate is high, and many of the patients are in Stage II. at operation, as at the Middlesex Hospital, the results of operation followed by a medium-voltage X ray course for one or two years, as shown by Sampson Handley's and some of G. Gordon-Taylor's figures, are approximately a 47 per cent. three-year freedom from recurrence. Handley has lately shown that in his Stage I. cases, with parasternal radium insertion and post-operative X rays, there has been 85 per cent. of "cures." Where operation is admittedly incomplete—i.e., where the axilla could not be cleared completely, or "recurrence" is evident a few weeks after the operation—the value of post-operative radiation may be demonstrated perhaps most conclusively. I have had 26 of these patients, all of whom were promptly treated with high-voltage radiation to the axilla and supraclavicular triangle; eight, that is, just under a third, showed no recurrence after two years. Without radiation it is not probable that so large a percentage would remain without signs of disease. Several patients have lived for over five years after growth was left adherent to the axillary vein, or was evident in the supraclavicular triangle at the operation or within a few weeks. An illustrative case may be summarised:—

CASE 2.—Aged 49; underwent radical operation in August, 1925, by Mr. E. L. Pearce Gould; the axillary vein could not be cleared completely. Four series of high-voltage treatments to the axilla and medium-voltage to the supraclavicular and scar areas followed. In February, Mr. Pearce Gould suggested that the treatment might be stopped. By October there were enlarged supraclavicular glands, which disappeared after two high-voltage treatments. In April, 1927, there were two recurrent nodules in the line of the scar, which by June were no longer palpable after further high-voltage treatments. The patient remains free from signs of recurrence. This case shows the advisability of high-voltage supraclavicular applications in doubtful cases at least, and the inadequacy of an *incomplete* medium voltage X ray course to prevent the appearance of secondaries in the line of the scar. The full course is two years with ten treatment courses; this patient had three only; recurrences 9 and 15 months after.

Primary Cancer of the Breast.

(1) *Inoperable.*—About one-third of all patients coming with breast cancer to surgeons come in an inoperable stage, and for these much can be done by judicious irradiation; the ulcers heal, the cutaneous and deeper nodules disappear, and the arm becomes more movable and less swollen. Some patients may be rendered operable, and for these excision by the diathermy knife is especially suitable. Of 86 advanced inoperable patients the results have been satisfactory for more than a year in only about 10 per cent., as chest and other metastases become evident in so many patients and overshadow the breast condition. It has been found impossible to estimate beforehand, without actual trial of radiation, how any given patient will respond, and for this reason it is worth while commencing the treatment of many apparently hopeless cases, as a few will be markedly benefited. S. E. Pfahler and B. P. Widmann report in their series an average duration of life of five years and one month, as against two and a half to three years in untreated cases. An inoperable case well after 11 years may be summarised:—

CASE 3.—Aged 62; sent for X ray treatment by Mr. Sampson Handley in 1917, as there were too many axillary glands for operation. In April, 1922, the right breast showed nipple retraction as it had for years, but was otherwise satisfactory; there was a rather large right axillary gland, a small hard one in the left axilla, and one in the right posterior triangle. More X ray treatment was given. Seen at intervals since, there is no sign of disease, and the patient is in very good health.

(2) *Operable.*—I have now had 20 patients with operable breast cancer treated with X rays or radium or both, in all of whom operation had been refused, or was considered inadvisable. I am satisfied that radiation is a justifiable alternative to operation, as with radiation alone the percentage of success closely approximates to surgical results, and is at present rather better. Of my operable series published two years ago[1] (excluding two cases dying of intercurrent disease, one who discontinued treatment, and the fixed ulcerated case classed as "inoperable" when she began radiation treatment), there is a 75 per cent. three-year "cure" of Stages I. and II., and a 100 per cent. "cure" of Stage I. These percentages of results with X rays and massive surface radium are similar to those of Hermann Wintz and of Pfahler in their operable series treated by X rays; as radiation results they are only likely to be equalled by radium needle insertion methods such as those of Neumann, Sluys and Coryn, and of Geoffrey Keynes.

"Chronic Mastitis."

Much attention has been drawn lately to "chronic mastitis" as a precursor of cancer, and clinical observations have been confirmed by Bagg's work on breast functional activity and on milk-retention in mice after parturition, which produced cancer in a large percentage of nursing animals after duct ligature. Also the work of A. Rosenberg on the menstrual breast has important bearings on the subject (see below). Sir Lenthal Cheatle has drawn a clear picture of the comparison between the successive changes in the skin resulting from tar-painting, and the changes in the breast terminal ducts and acini of degenerative hyperplasia, cystic retention, papillomata, and final malignancy. A similar series of changes has been lately described in the colon. It is a reasonable deduction that the effective treatment

[1] THE LANCET, 1926, i., 431.

of "chronic mastitis" will, in at least some cases, prevent the appearance of carcinoma. Little is known, however, about the beneficial effect of X rays on mastitis. The literature refers only to success with acute mastitis, as with other acute inflammatory conditions, and of a number of surgical authorities consulted Handley alone has been found to recommend X rays before operation in cases not responding to simpler measures.[2]

I have had 60 of these "chronic mastitis" patients, and in over 90 per cent. the result has been perfectly satisfactory after, as a rule, about four medium or high-voltage treatments by cross-firing the breast. One or two have been operated on for large painful breasts, or for continued neuralgia-like sensations, and of those traced only one has been operated on for malignant change. This supervened a year after medium-voltage treatment to a large breast had been stopped. High voltage would have been better for such a large breast.

In this series of "chronic mastitis" were six or seven who had been sent as cases of doubtful "early carcinoma" in the larger nodules. As Ewing reports a carcinoma of 2 millimetres in size in a patient 21 years old, there may have been other cancers in the series! These results are, from all preventive points of view, noteworthy, and should be emphasised in any comprehensive campaign against cancer. It is an unfortunate tradition among patients that anything wrong with the breast probably means an operation, and I am convinced from many inquiries that the fear of operation is largely responsible for the high percentage of patients who come for treatment not in an operable stage, much less a "mastitis" stage, but in a frankly inoperable and, so far as we know as present, a practically hopeless condition.

Artificial Menopause as an Aid.

X ray castration has been recommended by several radiologists in every case of breast cancer. This procedure has recently received evidence in its favour on the histological side by Rosenberg, Polano, Berberich, Loeschke, and others. They have shown the remarkable proliferation of acini which takes place in the breast monthly and regresses in the intermenstruum. That a similar proliferation of cancerous epithelium takes place monthly has not yet been proved, as far as I know, by animal experiments. John Fraser, however, in a personal communication, writes that he has several specimens in his possession which suggest that the carcinomatous change receives a definite stimulus at the menstrual period, although he does not regard the matter as proved. I have seen patients whose recurrences were doing very well under radiation treatment suddenly flare up when menstruation began after a stoppage of some months. Such cases suggest strongly, on the clinical side, that it might be well to consider as a routine the production of an artificial menopause in all breast cancer patients who have not already reached the natural menopause. I have thus treated six advanced patients as a late resource. Advocated by Sir George Beatson, oöphorectomy has been found by Sir Holburt Waring to be of marked temporary service in about 30 per cent. of patients. As the X ray menopause can be induced in the great majority of patients in one to three hours with a minimum of disturbance, it is suggested that this is a matter which urgently requires discussion as a neglected but possibly valuable factor in the general treatment of cases, whatever local method be employed.

Conclusions.

1. It was once true, but is true no longer, that the only chance for the patient with cancer of the breast is early operation.

2. By radiological methods alone, or as the main treatment, results are being obtained in cancer of the breast similar to those in cancer of the cervix; a certain percentage of inoperable cases are cured, and the results in the operable group are rather better than those from surgery alone.

3. Combined methods of radiation and operation offer a fruitful field for further advances. The radiation artificial menopause is a little used but possibly valuable auxiliary treatment.

4. Radiological methods simulate and also encourage the natural attempt at cure, usually seen only in isolated subcutaneous nodules, by causing degeneration of the malignant cells and arousing a lymphocytic and connective tissue reaction. Experimentally, radiated areas have shown an immunity to tumour implantation; this is an additional argument in favour of pre- and post-operative radiation. The tumour bed and adjacent lymphatic glands appear to be stimulated (Douglas Quick and Max Cutler: in neck cases).

5. Operative removal is sometimes followed by the rapid growth of previously latent secondaries, possibly by loss of a "growth-restraint" of the primary (Ewing). For this reason, among others, conservative radiation methods may prove to be on the whole better, in some forms of cancer at least, than radical operation.

6. Experimentally and clinically the best way to stimulate a growth appears to be to cut into it. Clinically this has been seen in sarcomata, the inflammatory type of breast carcinoma (acute carcinoma incised by mistake for mastitis with immensely rapid growth following), and other carcinomata. (For inflammatory breast cancer radiation offers the only hope: Lee and N. E. Tannenbaum.)

7. In the hope of avoiding a considerable percentage of "recurrences" after incomplete operation, there is a very strong plea to be made out for invariable pre- and post-operative radiation of the operation area and the adjacent lymphatic drainage areas.

8. The present-day surgery of cancer may be said to be in a pre-Listerian stage. A new axiom might well be formulated and acted upon; no operations should take place on live unsterilised tumours.

9. The ideal method is for all new patients with malignant disease to be seen by the surgeon and radiologist in consultation. This was done at the Middlesex Hospital for some time by the late Mr. T. R. Kellock.[3] As a rule, however, the purely surgical view prevails, and radiotherapy is considered merely as an adjuvant to surgery—to be employed only when surgical means have failed, as surgery was once regarded by medicine. Sir Henry Gauvain has lately suggested how prejudicial to the public interest this segregation of radiological departments from the full clinical stream must be. Radiotherapy has become a new specialty of method, and there is much to be said in favour of giving the radiologist, as a cancer therapist primarily, a status of real equality with his other hospital colleagues, and the charge of a department with out-patients and beds, like that planned for Prof. Gösta Forssell in Stockholm—a 50-bed clinic in the new Serafimer Hospital.

If the voluntary hospitals, with their many other commitments, can make no full provision for advanced X ray and radium therapy in cancer, it is to be hoped that the Ministry of Health will initiate or support any movement for cancer clinics throughout the country (as in France) where the possibilities of radiotherapy may be fully explored. The annual mortality from breast cancer is about 5000, a thousand more than ten years ago in England, and surgical technique has been perfected for so many years now that there is not likely to be much lessening of the mortality unless expert radiological methods are more extensively employed than they are at present.

[2] See Choyce's Surgery, second edition, 1923, ii., 28.

[3] THE LANCET, 1922, i., 552.

NEW BRIXHAM HOSPITAL.—Earl Fortescue, Lord Lieutenant of Devon, has opened a new hospital at Brixham, the gift of Mr. Charles Hellyer. There are 12 beds and two cots equally divided between the male and the female sides, and four private wards.

THE SACRO-ILIAC PROBLEM.

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WHETHER or not the sacro-iliac joint is ever liable to disabling displacements in the absence of severe trauma has been the subject of much discussion from time to time. Warm support has been given to the claim that manipulation, with or without strapping, cures or rapidly alleviates the distressing symptoms. These same claims have been equally warmly rejected. In the group of cases which form the subject of this report three factors have been constantly present.

(*a*) A history of relatively sudden onset of pain in the back following a muscular movement of the "surprise" type, and quite insufficient to cause a dislocation of a joint the size of the sacro-iliac synchondrosis.

(*b*) An inability to cough without pain and without accentuating all symptoms.

(*c*) A complete inability (not necessarily on account of pain) to lie flat on the back and lift both legs (when separated by about six inches) simultaneously off the ground with the knees fully extended.

All the patients have been more uncomfortable in a sitting position, or when passing from this to standing, than when fully erect. The majority also have been unable to roll in bed towards the affected side without a spasm of radiating pain.

A medical man who has suffered from this distressing condition described his history and symptoms to me in detail as follows:—

"At the time of the onset I was just recovering from a rather prolonged and debilitating attack of bronchitis. One morning, when sitting at stool, I was seized with a more than usually severe bout of coughing and suddenly 'felt something give' in the region of the left sacro-iliac joint. There was no pain. Nor was there any pain to speak of on first standing, only a vague discomfort. Very shortly after I bent to pick up a small bag, weighing a few pounds, and my return to the standing position was accompanied by an almost intolerable hot and stabbing pain which radiated down from the original spot to the back of the knee and left the whole of the back of the left thigh with a woolly, heavy feeling. Walking was not painful, only uncomfortable, and a limp did not develop until later. Work and duty could be carried out, though with a sense of insecurity. After some two weeks of this condition the stabbing attacks disappeared, leaving a continuous 'lumbago' backache with the whole of the left leg feeling heavy and somewhat unmanageable. At this stage the ilium, where it abuts on the sacro-iliac joint, felt more 'lumpy' than on the unaffected side. I was told, though personally I was unaware of it, that my trunk was no longer erect, but bent forward and to the left. The nearest approach to a comfortable position was standing with the left leg behind and the shoulders thrown back. Diathermy, ionisation, ultra-violet light, and radiant heat gave only temporary benefit."

When examining this patient I noticed for the first time a curious sign—namely, that while he could lie on his back and lift each leg with the knee straight without difficulty or pain, he appeared to have absolutely no power to lift both legs together. It was not a question of impending pain; he simply might have been paralysed for this particular movement. Passive movements without an anæsthetic, radiant heat, and strapping effected a reasonably rapid recovery.

Since then I have come to recognise that the double-leg-lifting test is important in distinguishing one group of "backache" cases from all others. It has been possible to collect a considerable number of these cases, both in hospital and private practice, and they all conform so closely to the first that it will be sufficient to give brief notes of two or three.

CASE 1.—A man, aged 26, was in a motor collision on May 4th, 1927, but was not turned over or thrown out; he thinks he swung suddenly to save himself from impact. He complains of pain deep in the left flank. Coughing hurts and shoots pain down the distribution of the left sciatic nerve. X rays show no bony injury or abnormality. On examination, single-leg-lifting is difficult, but can be carried out. Attempted double-leg-lifting produces no movement whatever of either leg—"no pain, just can't do it." Gripping the iliac crests, so as to close them up, immediately makes it possible to commence this movement. Pressing the iliac crests apart produces the same pain as coughing.

Treatment.—Absolute rest in bed, anodal galvanism, massage, movements, and gradual re-education effected complete recovery for general office work in three to four weeks, but a ban was put on rowing races.

CASE 2.—A married woman, aged 54, tried to lift a bed on Dec. 5th, 1927. Two or three hours later she noticed pain low down on the left side of the back. Sneezing and coughing were most painful; in some positions—e.g., getting in or out of a bath—acute pain radiated over the buttock. Rest in bed, ionisation, massage, and hot baths for a week did no good. When seen on Dec. 15th examination was very difficult on account of rolls of loose fat all round the loin, &c. Double-leg-lifting was, however, impossible and separating the iliac crests made any effort to raise the legs more difficult, while closing them made it possible to move the legs slightly.

Treatment.—Direct current was administered and the patient wore a corset with a pad of wool while resting in bed, with a pillow under the buttock. Massage was given, at first avoiding all passive movement. By Christmas Day the patient was well enough to go into the country and recovery was uninterrupted.

CASE 3.—An unmarried woman, aged 42, complained of pain in her back six and a half years ago. This definitely began after lifting a child aged 4 and running with her; she "felt something go" on the left of the spine, and has felt pain at intervals ever since. "I may go for weeks and months without discomfort, then a slight something sends a stab of pain down the left of my back and for a time after this any movement causes excruciating pain." When seen on March 7th, 1927, she stated that while changing her frock for dinner she had felt something click, with slight pain which afterwards gradually increased until at 9 A.M. she was completely incapacitated. Double-leg-lifting was impossible. Single-leg-lifting caused no difficulty and there was very little difference between the sound (right) side and the painful side.

Treatment.—Strapping, accompanied by Bristow coil treatment to all the muscles in the region of the left sacro-iliac joint, rapidly made the patient well, and by learning how to use the apparatus on herself she has been able to keep well.

The next case illustrates another aspect of this interesting group.

CASE 4.—A woman, aged 38, on trying to stand on her hands in January, 1924, "ricked her back" and ricked it again the same evening while dancing; this was followed immediately by pain in the back, made worse by any forward-bending movement. Coughing was painful except in the full knee-bend position, and pain could be diminished by holding something in front of her (in effect fixing the ribs, see later). On April 2nd, 1925, she caught a "chill" in church and then the pain returned, only worse, and went down the legs in a spasm. A celluloid corset, partially immobilising the sacro-iliac joints, was a great help.

CASE 5.—A man, aged 22, strained his back wheeling a barrow in June, 1927. There was no slip or sudden emergency and he went on working after the pain began. He got well, but when skipping in September, 1927, the pain returned down the right leg and was also felt on sitting or coughing. On Dec. 20th, when first seen by me, this pain was still present and prevented all games. The X rays were normal. The double-leg-lifting sign was present and hypertension of the thighs relieved the pain. In the forward-lying position the iliac side of the sacro-iliac joint on the affected side appeared to project more prominently than on the healthy side. As this asymmetry largely disappeared after treatment, it is worth noticing, particularly as it has been noted in other cases. Treatment was carried out, as described below for the more severe and long-standing cases, and recovery has proceeded satisfactorily.

CASE 6.—A woman. The original injury was caused by turning to the left and leaning over to lift a coal scuttle; the right foot slipped on some grease and a feeling of something that "went" in her back was followed some days later by a disabling pain in the back and down the left thigh. In this case, rest in bed, strapping, and jackets only effected temporary improvement. On examination in the forward-lying position the sacro-iliac joint on the injured side was so loose that Mr. J. Cunning considered it justifiable, after all other methods had failed, to fix a screw through the joint. This he carried out successfully on Jan. 17th, 1923, and the patient was able to resume her duties as cook-general and has carried on successfully ever since. An X ray of the sacrum taken on Feb. 14th, 1928, by Dr. Bertram Shires showed the screw in its original position.

Any anatomical theory to fit the common factors in these cases must take into consideration :—

(*a*) The comparatively minor nature of the original trauma.
(*b*) The pain on coughing.
(*c*) The pain in the back that tends to radiate either down the sciatic nerve, over the buttock, or towards the groin.
(*d*) The eccentricities of posture and movement that produce pain, including visceral discomfort.
(*e*) The relief brought by manipulation, strapping, &c.
(*f*) The mechanics that bring about the inability of the patient to lift both legs when lying flat.

I sought the assistance of Prof. Lucas-Keene in the Anatomical Department of the School of Medicine for Women, and am indebted to her for the following hypothesis :—

"That the original injury is a comparatively minor tear of the inner portion of the quadratus lumborum muscle and of its anterior fascial covering commencing from the point where it becomes continuous with the ilio-lumbar ligament as this stretches, from the tip of the transverse process of the last lumbar vertebra, almost horizontally outwards to the inner lip of the iliac crest."

It is only necessary to glance at a dissection at that part of the quadratus lumborum which lies near the transverse process of the fifth lumbar vertebra to realise that a surprise contraction in an asymmetrical position might cause a tear more easily and with less force than in the well-recognised rupture of the plantaris muscle. Pain on coughing would, with such an injury, be a certainty, as this muscle must go into firm "holding" contraction to fix the lower ribs so that the diaphragm may carry out the movements of coughing, and any pull on the external arcuate ligament would be directly conveyed to the quadratus lumborum. Both the fourth and fifth lumbar roots of the lumbo-sacral plexus are in immediate anterior relationship to the quadratus lumborum, and any effusion, such as would accompany a tear, would be bound, particularly in changing postures, to give rise to curious "freak" symptoms and pain radiating down the sciatic nerve distribution.

Whether extension centrally of a tear of the fascial covering of the quadratus lumborum where this becomes continuous with the lumbar fascia could satisfactorily account for the frequent association of a variety of visceral symptoms in the chronic cases must be left for future investigation. It is sufficient to note that there is anatomical proximity between the inner border of quadratus lumborum and the sympathetic fibres passing to join the lumbo-sacral nerve roots. Finally, if we turn to Sherrington's works on postural tonus we can see why the uninjured ilio-psoas muscles can individually work and flex each thigh singly, but cannot do so when the more coördinated mechanism of double-leg-lifting is required. This necessitates balanced postural tonus in both quadratus lumborum muscles as a preliminary to movement. I consider that this hypothesis covers the majority of the symptoms so well, and corresponds with the effective lines of treatment so closely, that it may be accepted as a simple working description of a controversial condition.

Treatment.

This naturally depends largely upon the duration and severity of the symptoms, but not a little upon the size, age, weight, and fatty covering of the patient. In heavily built patients with severe pain and complete inability to begin double-leg-lifting, rest in bed completely flat, with a pillow under the buttocks, is the first essential. If, after a period of rest accompanied by daily applications of direct current, the pain is not lessened on voluntary movement, strapping should be put on, covering a wide area from below the level of both sacro-iliac joints to two or three inches above them, and extending outwards as far as the anterior superior spines. If this strapping also fails to improve matters, some form of manipulation is necessary. For this I remove the adhesive plaster and the patient is anæsthetised on a mattress on the floor. General mobilisation movements are carried out, first with the sound limb and then with the affected one. In the ordinary lying position these are usually found to be equal and full on both sides, but in the forward-lying position hyperextension of the thigh, with the sacrum fixed, is generally less full, and it is this movement above all others that requires carrying out until it is full and free. The patient is then returned to bed and treated for two or three days as before, flat on back with a pillow under the upper part of the buttock to maintain slight hyperextension of the thighs, and with daily applications of direct current, (anode). Massage and passive movements are then commenced, and at the end of a week strapping is reapplied and the patient is allowed up, provided that the ability to begin double-leg-lifting has returned. The patient should now be warned that many weeks' care will be necessary, and a list of the movements or strains to be avoided can be given him.

In the less severe cases strapping without rest in bed sometimes effects all that is necessary, or a surprise hyperextension of the thigh in forward-lying position, without an anæsthetic, followed immediately by reapplication of strapping, is sufficient to initiate a satisfactory process of repair.

Summary.

The group of cases described may, on account of the exact similarity of signs and symptoms, be considered as being caused by one uniform anatomical injury.

A hypothesis of the possible nature of this anatomical injury is put forward which differentiates it from the ordinary cases of sacro-iliac strain or rupture of the ilio-lumbar ligament so clearly described by Mr. W. A. Cochrane,[1] and a line of treatment is suggested which is uniformly successful when the signs and symptoms are limited to those described.

Clinical and Laboratory Notes.

MALIGNANT PAPILLOMA OF THE LEFT KIDNEY IN A BOY.

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Malignant papilloma of the kidney in a boy of 11 is uncommon, and the following case has some interesting features.

An anæmic, puffy-faced boy had been suffering from an attack of (?) "nephritis," which started with headache and hæmaturia in May, 1927. He gave a history of a similar previous attack in May, 1926, and of measles and whooping-cough in infancy. His urine in May, 1927, was deeply blood-stained, but there was no history of the passage of blood-clots nor of any vesical symptoms, and his general appearance suggested nephritis. After some days it was noted that the hæmaturia was inconstant and that the patient complained of vague hypogastric discomfort. This led to a thorough clinical investigation, and the urine on microscopical examination was found to be free of casts, but to contain red blood cells, pus cells and *Bacillus coli*. Radiographic examination showed no obvious lesion of the urinary tract, and the only clinical finding was a palpable left kidney which, however, was painless.

His condition temporarily improved, but in October, 1927, the anæmia was more marked and the hæmaturia pronounced ; the urine contained red cells in large numbers and pus cells, but no casts or organisms. Examination for the tubercle bacillus was also negative. He still complained of headaches and occasional vague hypogastric discomfort, but other signs or symptoms were absent. On cystoscopic examination the bladder mucosa was found to be congested and the left ureteric orifice suggested a lesion of the left kidney ; but owing to the small size of the urethra a catheterising instrument could not be passed for examination of ureters or pyelography. Abdominal palpation under the anæsthetic revealed a definitely enlarged left kidney, but

[1] A Consideration of Backache from the Orthopædic Standpoint, Edin. Med. Jour., April, 1927.

the outline appeared smooth; the right kidney could not be felt, nor could the liver or spleen. Owing to the uncertainty of the condition of the right kidney it was decided to try palliative treatment, and the boy's general condition improved, but the intermittent hæmaturia remained.

In January, 1928, another examination of the urinary tract was made. The urea-concentration test gave a third-hour concentration of 4·5 per cent. Cystoscopy showed an apparently normal bladder mucosa, but from the left ureteric orifice came regular jets of blood-stained urine, necessitating repeated refilling of the bladder; the right ureteric orifice appeared normal and had a clear efflux.

Operation.—On Feb. 2nd a left nephrectomy was done through a left ileo-lumbar oblique incision. Several accessory vessels had to be ligatured before delivery of the kidney, the lower two-thirds of which were apparently cystic with a few solid nodules under the capsule, particularly on the posterior surface. The ureter was double. After securing the pedicle and ureters the kidney was removed and examined macroscopically, when it was obvious that the part connected with the lower ureter was the site of a malignant papillomatous growth. In view of this the left ureter was further removed, as low down as possible, and the pedicle stump examined for possible metastasis, which was not found. The wound was sutured in the usual manner, a small tube being left in for drainage of serum.

Examination of the Kidney.—The kidney consisted of two parts: a smaller upper pole, which occupied rather less than one-third of the organ and consisted of apparently normal kidney substance, and a lower part which consisted of a central papillomatous mass surrounded by a cavity filled with blood-stained fluid, occupying the part that should have been the cortex. This lower part was separated from the normal kidney area above by a thin fibrous partition, lined on the cystic side by epithelium. The upper ureter passed to the normal kidney area and had no pelvis, but opened into two small calyces which embraced normal papillæ. The lower ureter had a small pelvis which divided into four tubes, each opening into the cystic space around the papillomatous mass. Embraced by the pelvis and its four divisions at the centre of the hilum was a mass of dense tissue with branched processes passing to the capsule. The part of this tissue nearer the hilum was covered with smooth mucosa continuous with that of the ureter and with that lining the cystic space and the under surface of the capsule; the remaining part formed a framework on which was situated the papillomatous growth. The only renal tissue present consisted of a small layer about ¼ inch thick at the junction of one of the branches of the central mass with the capsule, on the convex border of the kidney. Examination suggested that the papillomatous mass and dense framework were developed from the ureteric bud which normally gives rise to the collecting part of the kidney, and that, with the exception of the small area mentioned above, the nephrogenous tissue which normally gives rise to the secreting part of the kidney had failed to develop. Microscopical examination showed the growth to be a papillary carcinoma.

Progress after Operation.—The patient made steady progress for some days after the operation, the wound healed by first intention, no further hæmaturia occurred and the general condition improved remarkably. On Feb. 29th he complained of vague pain in the left iliac fossa and also of pain resembling left renal colic. At this time there was also a rise of temperature, but all the symptoms disappeared after an enema. On March 3rd there was vague pain in both iliac fossæ and the liver edge could be felt. On the 7th the liver edge was lower and the pulse-rate increasing; radiogram showed free excursions of both sides of the diaphragm and a marked increase of the liver shadow, but no definite evidence of metastases in the chest. A leucocyte count showed 5000 per c.mm. The liver increased rapidly in size from day to day, the edge being below the umbilicus on the 12th, while on the day he died, March 14th, it occupied nearly the whole of the right iliac fossa.

Post-mortem Examination.—The liver filled practically the whole of the right side of the abdomen, and weighed 5 lb. 10 oz. It was studded throughout with secondary deposits. There was also a mass of carcinomatous tissue near the pedicle of the left kidney, while the right kidney appeared to be normal. There were, in addition, secondary deposits in the lower lobes of both lungs, in the form of projecting nodules about as large as marbles, and the bronchial and the posterior mediastinal glands were extensively involved. Microscopical examination of the secondary growths showed cells similar to the kidney tumour but with the usual tendency of carcinoma cells derived from mesothelial structures to simulate sarcomata.

The interesting features of this case are: (1) The age of the patient. (2) The condition of the left kidney. (3) The extremely rapid development of the metastases after removal of the primary growth. The case also emphasises the importance of thorough examination of all cases of hæmaturia. It is impossible to state whether in this patient the results would have been different had earlier operative treatment been adopted.

A CASE OF
THORACIC AND ABDOMINAL STREPTOTHRIX
WHICH TERMINATED SUCCESSFULLY, TOGETHER WITH A NOTE ON TREATMENT WITH AN AUTOGENOUS VACCINE.

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THE following case seems suitable to record, as recovery from a streptothrix infection of the chest or abdomen is not common. The case was treated with a vaccine, amongst other remedies, and seemed to benefit thereby.

A female, aged 24 years, whose previous history had been good, attended a football match on the afternoon of Dec. 12th, 1925. The same evening she felt cold and shivery, and had attacks of vomiting all night. The next morning she felt better, but in the evening the vomiting returned, accompanied by pains in the abdomen. She was seen by Dr. McIlraith late that night. The movements of the abdominal wall were good and there was no rigidity, but slight tenderness was found in the left iliac fossa. On rectal examination no tenderness or swelling could be found in the appendix region. The temperature was 99·8° F. The pain continued, though the vomiting ceased on Dec. 14th, and on the 16th a distinct swelling could be felt in the appendix region and the temperature then was 98·8° F. in the morning and 99·2° F. in the evening. She was operated upon on Dec. 18th and the appendix was removed in a state of early gangrene. All appeared to be satisfactory for ten days, but on the 28th febrile symptoms developed and pain was complained of in the right lumbar region. The temperature continued to rise and the pain to increase, so that on Jan. 4th, 1926, the right perinephric region was explored, but nothing abnormal was found. This was followed by steady improvement in pain and temperature until March 8th, when pains developed in the suprapubic region and the temperature rose to 101° F. A condition of colon bacilluria was found and was treated by a vaccine. The pain and temperature gradually subsided and the urine became bacillus free.

In the latter part of April she went to the seaside and while there had a recurrence of the pain in the right lumbar region, accompanied by a hectic temperature. She was brought home and, when examined, marked diminution of movement of the right side of the chest and decided bulging of the lower ribs on that side was found. She was seen by Dr. Herbert French in consultation with Dr. McIlraith on May 17th. Dr. French explored the chest and found thick blood-stained pus.

Mr. William Turner saw her for the first time on May 26th, and on the 28th, under a general anæsthetic, a needle was put into the ninth interspace in the nipple line and blood-stained pus was found. Portions of the eighth and ninth ribs were removed and a large abscess, the size of an orange, opened in the pleura. The lower wall of the abscess cavity was dome-shaped and smooth and no communication through the diaphragm could be found, though the liver dullness was definitely greater than normal. Actinomycosis was suspected, and on examination of the abscess contents this was confirmed bacteriologically. The abscess itself did well, but the temperature remained high and there was no improvement in the general condition. In the middle of July a new swelling developed in the epigastrium and over the margin of the ribs, and on the 30th Mr. Turner opened a second large abscess, which was evidently between the liver and the diaphragm. A vaccine was prepared from the contents of this abscess and injections were given every five days, starting with a 1 minim dose.

The strength of the vaccine was 1 mg. per c.cm. There was no apparent result save that the granulations of both operation wounds increased greatly and became very vascular. Twelve minims were injected on August 12th, and the granulations were painted with a mixture of brilliant green and methyl-violet in equal parts of a 5 per cent. solution in alcohol, and the abscess cavity was packed with strips of gauze soaked in the same solution. One c.cm. of the vaccine was given on August 24th, and it was decided to abandon the large doses of iodide preparations which she had been having by mouth, as during the whole of the illness no intravenous injections could be made owing to the fact that it was found impossible to distend any of the superficial veins sufficiently, and it was of course impossible to suggest cutting down on veins for this purpose.

No progress was made up to Sept. 17th, when she was seen by Sir Chartres Symonds. There was then bulging in the side behind the first operation wound and it seemed likely that another abscess was forming in this position. It was decided to continue the vaccine treatment and await further developments. Twenty minims were given on Sept. 28th and 22 minims on Oct. 1st, and on the latter date the temperature reached normal for the first time since April, and after Oct. 7th showed no evening rise. The granulations had by this time completely disappeared, leaving a healthy sinus from front to back and the swelling in the side was much smaller. The vaccine was injected weekly until the end of October, and, subsequently, fortnightly. The sinus had closed by Nov. 4th and vaccine treatment was continued at monthly intervals until June, 1927.

She is now in perfect health and able to carry on her duties as a masseuse.

Notes on Bacteriology by Dr. BRAXTON HICKS.

On May 28th I received from Mr. Turner some pus and three pieces of tissue. After prolonged search through several smears of the pus, a few filaments and one mass of streptothrix were encountered, and rapid sections of the three pieces of tissue showed streptothrix in only one. Attempts to cultivate the streptothrix failed.

Mr. Turner asked my opinion as to the possible success of an autogenous vaccine, as the patient's condition was desperate. Recovery has been recorded even with a stock actinomycotic vaccine, for the difficulty in providing an autogenous vaccine arises from the inability to induce the streptothrix to grow on artificial media in every case. However, some fresh pus having been sent by Mr. Turner on July 30th, a fairly abundant growth of the streptothrix was obtained in glucose broth under anaerobic conditions (Mackintosh and Fildes jar). Subcultures (fortunately luxuriant) were only obtained on the first occasion, all attempts to raise a second series failing. After centrifugalising down from the broth cultures, the streptothrix was washed several times in saline. The supernatant saline was removed from the last washing as far as possible to the last drop, the resultant wet mass being ground up in a small sterile agate mortar. This squeezed out a certain amount more fluid, which was dried off in an oven, taking great care not to dry out the mass completely. A slightly moist mass resulted, which could be weighed, and an original stock suspension was made up of a strength of 1 mg. per c.cm., of which the patient had an initial dose of 0·05 mg. in August. Later on (October), in the course of the disease, the stock was increased to 4 mg. per c.cm.

In discussing the part the vaccine played in this case it must be remembered that the patient had many lines of treatment going on at the same time. I have seen a number of cases of streptothrix infection of abdominal and thoracic regions, but I do not remember to have seen one clear up on iodine or iodides. These always are, and should be, tried. The brilliant green and methyl-violet mixture kept the wound clean and lessened the exuberance of the granulations, but there is evidence that the vaccine clinched the cure. Soon after the vaccines were started the granulations became vascular and large, and I think that was a sign of progress in healing, for the granulations in streptothrix are not particularly vascular. Moreover, in the latter part of September, a swelling was developing in the region of the original operation wound. At this time the vaccine had been pushed up to 1 mg. of the streptothrix mass and immediately after this dosage had been reached the temperature began to reach normal and the swelling to subside. The increase in the dosage was continued systematically and carefully, until she was taking 4 mg. of the streptothrix mass, so apparently large doses are easily tolerated.

A CASE OF
POST-VACCINAL SEROUS MENINGITIS.

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ALTHOUGH a number of cases of encephalitis and myelo-encephalitis following vaccination have now been reported, chiefly in the French literature, meningitis in this connexion seems to be a rare complication, and the following case may therefore prove of interest.

A school-boy, aged 11, was admitted to the Weir Hospital, Balham, on May 20th, complaining of headache, pain in the neck, and drowsiness. A fortnight before admission he had been vaccinated against small-pox. A week later he had complained of headaches and pain in the neck, becoming semi-comatose two days previous to admission.

On admission he was drowsy but irritable, and could be roused. Four pustules were present on the left arm. Nothing abnormal could be found in the heart, lungs, or abdomen. In the central nervous system, apart from the drowsiness, no definite abnormality could be detected at first, but by the fifth day general hypertonus had developed and Kernig's sign was present. The knee-jerks were not obtained, the plantar response was doubtful on the right and extensor on the left. There were no ocular palsies, and the fundus occuli was normal in each eye. Fever was present (102° F. on admission, falling to normal by the third day). Lumbar puncture was performed on May 20th, and fluid withdrawn under considerable increase of pressure. The latter was reported on as follows by Dr. Mary Schuster:—

"A water-clear fluid, with little deposit after centrifugalising, cells 50 per c.mm.; small mononuclears, 65 per cent.; large mononuclears, 30 per cent.; polymorphonuclears, 5 per cent.; a few red cells; sugar diminished in amount; chlorides, 0·67 per cent. (diminished); albumin, 0·03 per cent.; organisms: cultures sterile, no tubercle bacilli found; Wassermann negative."

On May 26th considerable improvement took place, and by June 8th the patient was quite bright mentally and had no symptoms. By this date the reflexes were normal and the patient was apparently fully recovered. He was discharged on June 10th.

In my opinion the clinical features, with the definite increase in the cell content of the cerebro-spinal fluid, place this case in the category of what Stiner refers to as "serous meningitis" rather than of an encephalitis.

References.—Levaditi, C., Nicolau, S., and Sanchio-Bayarri, V.: Presse Méd., 1927, xxxv., 161. Turnbull, H. M., and McIntosh, J.: Brit. Jour. Exper. Path., 1926, vii., 181. Winnicott, D. W., and Gibbs, N.: Brit. Jour. Child. Dis., 1926, xxiii., 107. Stiner: Quoted by Winnicott and Gibbs.

DONATIONS AND BEQUESTS.—Mr. and Mrs. J. B. Crichton, of Luthriebank, near Cupar, have given £10,500 to meet the cost of the upkeep of Adamson Cottage Hospital, Cupar. Mr. Crichton recently gave £5000 to the hospital. —Dr. R. Tudor Williams, who was drowned recently while bathing at Villerville, France, left the following legacies to North Wales Institutions: £500 to the Carnarvonshire and Anglesey Infirmary at Bangor, and £100 to each of the following: Llanfairfechan Nursing Association, Leeswood (Mold) Nursing Association, Caergwrle and Hope Nursing Association, Tryddyn (Mold) Nursing Association, Caergwrle Presbyterian Church, and Horeb Chapel, Llanfairfechan. —Miss Lucy Prince-Smith, Bournemouth and Staintondale, Scarborough, besides many other bequests, left £10,000 to the Royal United Kingdom Beneficent Association for general purposes, £2000 each to the Leeds General Infirmary, the Royal Victoria and West Hants Hospital, Bournemouth, the Royal National Sanatorium, Bournemouth, and the Victoria Hospital, Keighley; £500 to the Driffield Cottage Hospital, £1000 to Dr. J. Nicholson Dobie, of Keighley, and subject to certain other bequests, the residue of her property equally between the Leeds Infirmary, St. Catherine's Home, Bradford, the Royal Victoria and West Hants Hospital, Bournemouth, the Royal National Sanatorium, Bournemouth, and two other institutions.—An anonymous donor has given £1000 to the University of Manchester to be applied for general purposes as the council may determine.

Reviews and Notices of Books.

THE ROBERT JONES BIRTHDAY VOLUME.

A Collection of Surgical Essays. London: Humphrey Milford, Oxford University Press. 1928. Quarto. Pp. 446. £2 2s.

LAST week we reported the presentation of this volume at a dinner given to Sir Robert Jones by the authors of the essays contained in it, including the preface by Sir Berkeley Moynihan, and an appreciation by Sir John Lynn-Thomas. With the exception of the first article by Mr. Muirhead Little, which treats of the history of orthopædic surgery, all the essays are on clinical orthopædic subjects. The list of contributors of these, which includes five distinguished foreign specialists as well as one Canadian, is in itself evidence of the value of this volume as a serious contribution to orthopædic surgery. The editors tell us in a prefatory note that the idea of this book originated among Sir Robert's friends on the Council of the British Orthopædic Association, and that the 24 authors were selected from among his personal friends, those American and continental surgeons who had come under his influence chiefly during the war, and those British surgeons who have worked under him in the military orthopædic and pensions hospitals. A glance at the names of these writers prepares the reader for much interesting and instructive matter; it is proposed here to give in a bare outline some idea of their merits.

Prof. Osgood, of Boston, heads the list of foreign contributors with an essay on the frequent association of intestinal stasis with spinal sacro-iliac arthritis, a topic which is much thought of just now. The cases recorded fully justify the hypothesis implied in the title. Dr. Murk Jansen, of Leyden, has a reputation as a surgical pathologist which will suffer no diminution from a study of his paper on dissociation of bone growth. Prof. Putti, of Bologna, contributes a paper on two cases of tumour of the femur, which admirably exemplifies his resourcefulness and skill in bone-grafting. Prof. Nathaniel Allison, of Harvard, discusses open operations for congenital dislocation of the hip. Although he admits that manipulative reduction often gives good functional results, he prefers the security of a reconstructed acetabulum when risk of ankylosis is avoided by preserving the capsule. The same subject is dealt with by Prof. Hey Groves, who, however, is more optimistic as to the results of manipulative reduction in patients not too old. Dr. Jacques Calvé, of Berck-Plage, treats of a rare affection, infantile vertebral osteochondritis which he first described in 1924. The condition is of some importance, as it may be mistaken clinically for Pott's disease, unless radiographs are truly interpreted. This article, which is in French, is well illustrated with X ray pictures. Prof. Clarence Starr's short essay on acute infections of bone drives home the lesson that osteomyelitis should be detected and treated much earlier than is as yet usual. Mr. R. C. Elmslie's work on fibrocystic disease of bones is well known, and his words here add to our knowledge of the subject. Radiology has enormously increased our knowledge of ossification of the skeleton and its anomalies or rarities. Dr. Thurstan Holland's paper on the accessory bones of the foot conveys the results of great experience in this field, and is a valuable guide in the differential diagnosis between injury and abnormal development. Mr. Brownlow Mitchell, of Belfast, explains the mechanism of the production of spiral fractures and discusses their treatment. His X ray pictures show excellent results. The subject of peripheral nerve complications of fractures and dislocations of the elbow is an important one, for, as Mr. Harry Platt says, they may be the grounds for unfavourable criticism of the surgeon and even actions at law. The careful study of his paper should make such misfortunes rare—this is a very thorough paper. The president of the British Orthopædic Association, Mr. H. A. T. Fairbank, gives us a well-documented and reasoned essay upon infantile cervical coxa vara. Mr. McCrae Aitken writes on curvature of the spine. Mr. Rowley Bristow on cysts of the semilunar cartilages of the knee, the pathology of which he discusses thoroughly, and the same subject is touched on by Mr. S. Alwyn Smith in sidelights on knee-joint surgery. Mr. Blundell Bankart contributes a short but practical paper on dislocations of the shoulder-joint, including all its forms and ætiologies. Sir W. I. de C. Wheeler writes judiciously of bone-grafting in advanced cases of Pott's caries, and gives a table of the results in a consecutive series of 30 adults. Adult cases of Pott's disease are notorious for their high death-rate, but Sir William Wheeler only lost six of this series, one of whom, moreover, survived six years. Mr. G. R. Girdlestone's paper on arthrodesis and other operations for tuberculosis of the hip, and that of Mr. Laming Evans on astragalectomy are worthy of their position in the volume. Mr. Naughton Dunn on arthrodesis of the tarsus for foot deformities and Mr. W. H. Trethowan on fracture-dislocation of the ankle-joint deal with subjects of which they are acknowledged masters.

We have spoken with uniform praise of the contributions, and the high standard reached by them shows that all the writers considered the occasion as one in which they should put forth their best. The volume is well got up and fully illustrated, and any profits from its sale will be given to Sir Robert Jones for the funds of his scheme for the care of cripples.

HISTORY OF MEDICINE.

Storia della Medicina. By ARTURO CASTIGLIONI, Professor of the History of Medicine, University of Padua. Milan: Società Editrice "Unitas." With 389 illustrations and 3 colour plates. Pp. 972.

As the standard Italian histories of medicine were published over 60 years ago, and were even then incomplete, there was obviously need for a book to carry on the story and incorporate the results of recent research. It is peculiarly appropriate that the long record of medicine should attract Italian students, for nowhere else do past and present so meet and mingle as in Italy. From the busy streets of Milan one may step into the vast Ospedale Maggiore, founded in 1457 and still little changed since the seventeenth century, with its huge wards that have never lacked patients through the centuries. And in Siena it is even more striking to cross from the cathedral, with a constant stream of tourists pouring into it from luxurious motor-cars, and enter the great Hospital of Sta. Maria della Scala, founded in the eleventh century as a refuge for pilgrims as well as a hospital, where Santa Caterina laboured from day to day and S. Bernardino ministered to the victims of the plague in 1400, and where, out of an entrance hall frescoed by Sienese primitives, one passes at once into operating theatres and laboratories equipped with the latest inventions of medical science.

Of late years medical historians have been busy, and have gathered a rich harvest, and now the English reader need be at no loss for information, both authoritative and attractively set forth. Italy, with her awakened energies and self-consciousness, is leaving no field untilled, and it is fitting that, from her ancient and honourable University of Padua, Prof. Arturo Castiglioni should send out this stately and well-illustrated volume, in which the history of medicine is followed down to our own time. To cover so rich a field the author has, of course, been obliged to omit much; but he has arranged his material skilfully, and the significant peaks in medical history stand out clear, and the thread of interest is continuous and absorbing.

For English readers the most useful parts of the volume will be those wherein the achievements of Italians are described with legitimate pride—especially the later chapters in which the long succession is

brought down to our own day. A carefully selected bibliography is appended to each chapter, with most useful indications of the nature, scope, and value of each book—an example greatly to be commended. Here, too, one notes with satisfaction that English books enjoy full recognition. The book is lavishly illustrated—the subjects being very varied—although it is unfortunate that the reproduction of some of these is unworthy of their interest. There are thus brought together many portraits, pictures from old books, reproductions of works of art, and pictures of famous hospitals, among which it may be noted that the author has fallen into the pardonable error of including Christ's Hospital.

The book may be cordially commended to all who are interested in the subject. The hopes and aims which the author modestly puts forward in his preface are abundantly justified: "The object of this book is not to supply a treatise in which one may trace in minute detail the development of all the branches of medical study together with the names and lives of all the most distinguished physicians, but rather to supply a guide to those who wish to find their bearings in the great field of medicine and to allure them to deeper and wider studies."

THE EXTRA PHARMACOPŒIA OF MARTINDALE AND WESTCOTT.

Nineteenth edition. Revised by W. HARRISON MARTINDALE, Ph.D., Ph.Ch., F.C.S. Vol. I. London: H. K. Lewis and Co., Ltd. 1928. Pp. 1207 + xxxvi. 27*s.* 6*d.*

IT is less than four years since the last edition of the Extra Pharmacopœia was issued, but in a book whose purpose it is to convey succinctly the latest and fullest information in respect of chemistry, biochemistry, and pharmacy as applied to therapeutics, it is not surprising that during even this period many important advances should have to be chronicled, and many additions to medical knowledge enumerated. In fact, once again the Extra Pharmacopœia has had to undergo a process of thorough revision. The work in ward and laboratory which has thus been sifted and summarised, with a view to placing before the practitioner and the pharmacologist the latest information on drugs and therapeutic agents in a concise form, has been of large range, and the skill and industry exhibited by the author will be recognised by specialists in any of the individual subjects dealt with; the most casual consultation of Dr. Martindale's pages will bear this out.

The contents of the book, as our readers surely know, are arranged alphabetically, and under practically every letter of the alphabet some preparation is mentioned concerning which it has been found necessary to record new scientific facts or to readjust previous judgments. Let us take, for example, the notes under the headings of colloidal metals with reference to lead; in the edition of 1924 we have a paragraph in which it is set out that large doses of lead produce poisonous effects upon embryonic cells, and that malignant neoplasms appear to be arrested by the intravenous injection of colloidal lead. One or two American references and a citation from THE LANCET are given. In the new edition (see p. 372 et seq) the lead treatment of malignant disease requires a page and a half of closely written matter, many references to medical literature being given, and these are brought up to such a recent date as THE LANCET of a month ago. In view of the congress which is being held in London next week, the information on the therapeutics of lead in the treatment of cancer, carefully arranged in approximately chronological order, may be of considerable practical value. We may compare, again, the entry in the previous edition in respect of mercurochrome with the entry under the heading in the new volume where the necessary extension of information is still more obvious. In 1924 a brief note stated that as a vesical antiseptic the preparation was well tolerated, and its use in gonorrhœa and ophthalmia neonatorum was mentioned with cautionary words. We have now 12 carefully written pages, setting out, with full references, the value of mercurochrome as an antiseptic in cystitis, pyelitis, and infections of the urinary tract, and when used intravenously in many septicæmic conditions, in articular rheumatism, and in chronic malaria. We learn how mercurochrome, introduced originally as a urinary antiseptic, has been found often to replace iodine in antiseptic surgery, and that its employment in a variety of grave infections has been considered right within the limits of safety as they are ascertained. The well-known purgative phenolphthalein, or "purgen," forms another example of a well-known preparation concerning which there is far more valuable information given now than was possible four years ago, and it is admirably summarised. In 1924 some two pages were sufficient to say all that there was to be said; now nine closely written pages are required.

The legal utility of the volume is illustrated by the way in which poisons are dealt with. Throughout the book we have merely to glance at the name of a drug or a chemical product to ascertain by a distinctive sign to which part of the Poison Schedule the particular poison belongs, so that questions which constantly arise for the practitioner have their answers supplied succinctly. The Dangerous Drugs Acts are presented in an abbreviated form, and the amendments effected by the regulations of 1926 are included, as are a general posological index of over 10,000 items and a résumé of the Therapeutic Substances Act, 1925, and Regulations, 1927. It is certain that this remarkably handy compilation of necessary information will obtain as on previous occasions a large circulation. For ourselves its possession is a necessity.

INFECTIOUS DISEASES OF INFANCY AND CHILDHOOD.

By HENRY LARNED KEITH SHAW, M.D., Clinical Professor of Diseases of Children, Albany Medical College; Consultant in Child Hygiene, New York State Department of Health. London and New York: D. Appleton and Co. 1928. Pp 415. 16*s.*

THIS book is written not for the specialist, but for the practicing physician. Twenty-three diseases are described, including acute rheumatic fever, erythema infectiosum, glandular fever, septic sore-throat, rabies, and tetanus. All of them are not equally well considered, the chapters on poliomyelitis, epidemic cerebro-spinal fever, mumps, whooping-cough, and tetanus being perhaps the best. On the whole, the history, bacteriology, epidemiology, pathology, complications, prognosis, and treatment of each disease are discussed in detail, whereas the descriptions of symptoms, diagnosis, and differential diagnosis leave something to be desired. For example, in a chapter of 25 pages on measles, and in one of 19 pages on enteric fever, the diagnosis and differential diagnosis are disposed of in just over a page.

Dr. Shaw advocates a room temperature of about 68° F. for diphtheria, not over 70° F. for measles, 60° to 65° F. for scarlet fever, the same for whooping-cough, and about 70° F. for small-pox. It is true that he recommends plenty of fresh air, but such high temperatures will hardly permit of adequate ventilation by way of the windows at certain seasons of the year and, in our opinion, are likely to do more harm than good.

In writing of scarlet fever, he says that the strawberry tongue is absent in measles, but on turning to the description of the latter disease we find the contradictory statement, which we can confirm, that "the tongue may show in measles a striking similarity to that of scarlet fever." In the section on differential diagnosis between rubella and scarlet fever, which is far from complete, he asserts, with misplaced confidence, that "The chain of enlarged cervical

lymph-nodes, small and not painful, and easily rolled about under the fingers, is never present in scarlet fever." The description of the chicken-pox eruption is disappointing and the diagnosis of this disease from small-pox, as set out, does not sufficiently emphasise the importance of the distribution of these eruptions. The lesions of small-pox are here stated to be uniform in size: this is not our experience, nor is the prodromal scarlatiniform rash of chicken-pox as rare as he implies. The life of the rubella rash is described as follows: "It fades, first, on the face after two or three days, and then over the rest of the body, and the entire period of the eruption does not last over three or four days." It is correct that the eruption first fades on the face, but it is unusual for it to persist there even for two days, or for the eruption to remain on any part of the skin surface more than 72 hours after its appearance. Dr. Shaw tells us death is almost certain in septic or malignant cases of scarlet fever. That death is almost certain in malignant scarlet fever all will admit, but though the fatality rate is high, recoveries from the septic form are not uncommon.

These small criticisms are called for in case of a further edition appearing, but on the whole the information supplied is reliable and clearly presented, while the book gives in convenient compass much information of interest to the practitioner. It is well printed, beautifully proportioned, and sufficiently illustrated. Three coloured plates show the Dick reaction, the Schick reaction, and diphtheria membrane. These are all very good, and the illustrations of severe pharyngeal diphtheria and typical tonsillar diphtheria are particularly worthy of praise.

An interesting introductory chapter is supplied by Dr. Edward S. Godfrey, Director of the Division of Communicable Diseases, on the responsibility of the attending physician in cases of communicable diseases, and the chapter on tuberculosis in children is by Dr. William E. Lawson, physician-in-charge, Albany Hospital Tuberculosis Sanatarium.

MEAT INSPECTION.

The Principles and Practice of Meat Inspection. By GERALD LEIGHTON, O.B.E., M.D., D.Sc., F.R.S.E., Medical Officer (Foods), Scottish Board of Health. London: W. Hodge and Co. 1927. 25*s*.

THE book is divided into two parts: Part I. dealing with General Principles, and Part II. with Regional and Special Meat Inspection. Part I. includes accounts of methods of inspection, of meat and its characters, of the lymphatic system, and of the general pathology, parasitology, and bacteriology of meat inspection, with chapters on Abattoirs and Slaughter-houses and on Methods of Slaughtering, the latter taking up no less than 34 pages. The last chapter in Part I. is entitled Judgment and Condemnation, and it is unfortunate that its ten pages should be confined to the Scottish instructions and the English recommendations. This chapter might have been amplified with advantage and have included a discussion of the scientific grounds for these official recommendations, since many difficulties arise in practice and the subject is of great importance.

Part II. is a clear and valuable account of the different abnormal conditions which may be found. The arrangement is a little difficult to follow, since one chapter deals with one disease (tuberculosis), the next with diseases in one animal (swine), while of the following chapters some deal with special organs and others with special regions (thorax and abdomen). Thus tuberculosis of the pig is discussed in one chapter while paragraphs on tuberculosis of swine are found elsewhere. Two useful sections are devoted to edible fish and inspection of fish, while notes on inspection of game and poultry are also included. The term "meat inspection" in this volume is used in a very limited sense. Very little is said about the characteristics and inspection of imported meat; the large and important subject of made-up meat foods is entirely ignored, while reference to canned foods is confined to a quotation from an American paper on the examination of spoiled canned foods, which is mainly a discussion of laboratory methods and gives no help in practical inspection work.

The book is for the most part a guide for the meat inspector working in public abattoirs or slaughter-houses. Good advice is given for the detection of gross pathological lesions, but while this is the most important aspect of the practical work of an inspector the value of the microscope and of other auxiliary methods of investigation deserve his attention. Such methods stimulate interest, advance knowledge, and supply additional proof in cases which come before the courts. The author does point out that "a standard text-book on bacteriology should always find a place on the meat inspector's book-shelf," but he does not emphasise the fact that the trouble of taking it down from the shelf and studying it will be rewarded. The illustrations are numerous and for the most part excellent.

BIRTH CONTROL.

Some More Medical Views on Birth Control. By Eleven Contributors. Edited by NORMAN HAIRE, Ch.M., M.B. London: Cecil Palmer. 1928. Pp. 239. 7*s*. 6*d*.

Medical Help on Birth Control. By Fourteen Contributors. London: G. P. Putnam's Sons. 1928. Pp. 225. 6*s*.

Parenthood: Design or Accident? By MICHAEL FIELDING. London: Labour Publishing Company. 1928. Pp. 96. 2*s*. 6*d*.

The Night Hoers. By ANTHONY LUDOVICI. London: Herbert Jenkins, Ltd. 1928. Pp. 288. 7*s*. 6*d*.

THE first of these books is produced as a counter to a book, edited by Sir James Marchant, and reviewed in THE LANCET, 1927, i., 1165, the tone of which was unfavourable to the practice of birth control. Dr. Haire points out that not one of the eight contributors to Sir James Marchant's book appeared to have had any considerable experience of contraceptive practice. He also states that the average age of these eight contributors is 62, and suggests that their views may not be representative of the medical profession—particularly of its younger elements—as it exists to-day. The second book is offered to the public in response to the statement recently published in the *Church Times*—viz., "the public has a right to expect better guidance from doctors than it gets at present in this matter." Both books, therefore, consist of a collection of essays written, with two exceptions, by medical men or women favourably disposed to the practice of contraception. They are intended for the general public. Comparatively little is said about the purely medical aspects of this question. Religious, ethical, and sociological arguments, most of which have been used before, are advanced with a considerable amount of repetition. To those acquainted with the literature of the subject, the most interesting essay is that appearing in the second book, by Mr. Warren R. Dawson, entitled "Early Ideas upon Conception and Contraception." This contributor adduces new evidence as to the practice of contraception by the early Egyptians. A novel point of view is that propounded in the first volume by Dr. M. D. Eder, writing upon the subject of the psychology of birth control. This essay does not contain, as might have been hoped, an account of the psychological effects of the various contraceptive practices upon different people. It is concerned with an exposition of the psycho-analytic theory of why people approve or disapprove of birth control. According to this theory, people disapprove of it because they are animated by "life instincts." And people

approve of birth control because they are dominated by ego-instincts. No suggestion is made as to why one instinct should predominate over the other in a given individual, and the remedy proposed by Dr. Eder as a solution of the conflict may strike the reader as banal. "Education," it is said, "is the weapon with which such opposition is to be fought." While both books may well be of interest to lay readers, it does not seem likely that they will prove very informative to members of the medical profession.

This statement, however, does not hold of the third book under review. The author of "Parenthood: Design or Accident?" is a medical man writing under a pseudonym, and the book fulfils a real need. The author clearly has had considerable experience of contraceptive methods, and his little book is compact and relevant. Its most valuable feature is the comparative treatment of the indications for the use of different contraceptive methods, and this book may be recommended as containing one of the most impartial and balanced discussions of the practical and technical aspects of birth control that has yet appeared from the pen of a medical writer.

The standpoint from which the last book of the series is written, and also the motive which inspired the author to write it, are summarised in the following sentence of the preface:—

"From the correspondence that has been printed in the various London journals during the last two or three years, it would appear that there is a large body of public opinion in this country which, although not resting on the foundation of any religious orthodoxy, is strongly opposed to birth control, and it is partly with the view of providing those who represent this body of opinion with as complete a statement as possible of the case against the new teaching, and also of giving them an alternative solution, that this work was undertaken."

From the outset, therefore, the book compels attention. The criticisms of birth control here advanced do not emanate from a theological assumption as to the nature of God's will, nor from a biological dogmatisation as to what is and is not "natural." They emerge from certain sociological, psychological, and medical considerations for which much interesting evidence is adduced. The essential thesis of the book is the contention that by modern contraceptive methods good stocks are eliminated as much as, or even more than, bad ones. The reduction of the birth-rate is achieved at the expense of valuable, rather than of useless, strains. The selection is blind. Birth control is a process of night-hoeing, in which the wheat is likely to be cut down with the tares. The author argues that the problems of overpopulation and degeneracy are intimately linked with one another, and that any reduction of the population which, in the future, may prove necessary should first and foremost be a purgation of degenerates. And the author outlines a policy to guide us in such a purgation. Of the books written in recent years against the practice of birth control this is by far the best. The author has been at pains to acquaint himself with the voluminous literature which the subject has now acquired, and he writes with a trenchant lucidity which makes his book a pleasure to read.

An Approach to Winged Flight.

By John D. Batten, M.A. Brighton: Dolphin Press. With photographs. Pp. 78. 5*s*.

This little book contains much new and original information and is illustrated by eleven photographs and ten line drawings which render the exposition clear. Mr. Batten begins by pointing out the essential difference between the flight of insects and that of birds, it being the latter with which his experiments are concerned. In many birds, especially the larger birds such as the albatross and the condor, flight is attained by keeping the wings almost stationary on the principle of gliders. This suggests that the pectorales majores exert almost entirely a *postural activity*, their function being to keep the wings from flapping upwards, just as the chief function of the quadriceps extensor is, not to extend the knee, but to keep the knee from bending. Mr. Batten has found that a twisted skein of natural silk, as obtained from the cocoon, forms an exceedingly strong and light spring to maintain the wings of his model horizontal. A four-skein torse of 23 in. span twisted by a rod or lever in the middle will sustain a boy "weighing 8 st. 2 lb. hanging by his hands 2 ft. 6 in. out along the lever" which is then horizontal. If desired the mere weight of the man could maintain the wings horizontal, but this appears to be more than is required.

In the tentative model (Photos. VI. and VII.) the man's hands grasp two levers controlling the two wings while his feet rest on a firm base board. When his knees are slightly flexed, the wings are horizontal, by pulling against the base board and extending his knees, as in rowing, the wings are depressed, and on bending his knees and relaxing his muscles the wings are raised. The upward movement of the wings will occur from the fall of the body between the wings when the pressure of the air will raise them. If the rhythmic movement be in the same phase and of the same period as the oscillation period of the wings, the wings can be flapped with very little exertion and practically no fatigue. Great attention has been paid to the problem of rising easily from the ground, and also to that of landing.

The book contains valuable suggestions for all who are interested in the problem of flight.

JOURNALS.

British Journal of Children's Diseases. Vol. XXV. April-June.—Dr. C. P. Symonds contributes a critical review on encephalitis periaxilis diffusa—Schilder's encephalitis. He states that until the publication of papers by Bouman, and Collier and Greenfield in 1924 this disease was unknown except to a few neurologists. It usually occurs in children and young subjects without any obvious cause. The onset lasts a few days and the course is progressive with some remissions to a fatal issue after a duration ranging from a few months to three years. The chief early sign is cerebral blindness, which is followed by mental impairment and increasing spastic paralysis. The condition is usually bilateral but may commence on one side or be confined to one side. The disease may begin in the occipital lobes or in some other part of the brain. In several cases a familial incidence has been noted, which is in favour of an infective cause such as neuro-syphilis, or indicates inherited abiotrophy. Post-mortem examination shows areas of softening in the central white matter of the affected lobes. Histologically, there is general infiltration of the brain with round cells engaged either in the removal of myelin or the formation of glia fibrils. The vessels are surrounded with fat-laden granule cells, phagocytic cells of glial origin, and small round cells of the size and shape of lymphocytes.—In a paper on Hemiplegia associated with Extensive Nævus and Mental Defect Dr. T. Brushfield and Dr. W. Wyatt describe the pathological changes found in the cases of which they had previously related the clinical features. They conclude that the paralytic manifestations may be ascribed to the presence of intracranial nævi and the mental defects only partly to this cause, as they found a definite under-development of the neurones throughout the brain.—Dr. Eric Pritchard reports an Atypical Case of Achondroplasia, illustrated by skiagrams, and comparable to the atypical forms found in animals such as pug dogs.—Dr. Kaj. H. Baagoë, of Copenhagen, records his Investigations on the Pirquet and Wassermann Reactions in Asthmatic Children. From examination of 83 asthmatic children, aged from 2 to 15 years, he found that a positive Pirquet reaction was not more frequent than among ordinary hospital children, thus confirming Wallgreen's view that there is no ætiological connexion

between hypersensitiveness to tuberculin and asthma. Examination of the Wassermann reaction in 92 asthmatic children showed that it was invariably negative with the exception of a child suffering from syphilis acquired at the age of 1 year. Baagoë's investigations therefore do not support the view that syphilis plays any part in the development of asthma.—Dr. Robert Hutchison reports a case of Severe Anæmia Treated with Liver in a boy aged 6 years. The case was apparently an example of anæmia gravis, not pernicious anæmia. Immediate and striking improvement, however, followed administration of cooked liver.—Dr. A. Joe records a case of Gangrenous Chicken-pox associated with *B. diphtheriæ* in an infant aged 13 months, which ended fatally.—An Anomalous Case of Deafness Successfully Treated by the Electrophonoïde Method is related by Mr. Macleod Yearsley [1] in a boy aged 10, in whom the deafness was probably due to delayed development. The abstracts from current literature are devoted to diseases of the blood and spleen.

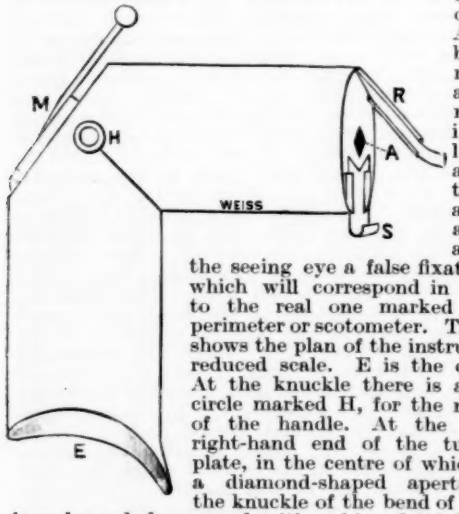
INDIAN JOURNAL OF MEDICAL RESEARCH. Vol. XV. April, 1928.—Dr. A. N. Goyle describes comparative experiments on the transmission of plague by fleas of the genus xenopsylla in which he has demonstrated the superiority of *X. cheopis* over *X. astria* as transmitters of the plague bacillus.—A. C. Craighead and S. Das give an account of a survey of Pusa Estate, the headquarters of the Imperial Department of Agriculture, for sandflies of the species *Phlebotomus argentipes*.—R. N. Chopra, J. C. Gupta, and N. N. Ghosh have studied the Indian varieties of aconite, their chemical composition and biological assay, while the senior workers with various collaborators have completed similar pharmacological studies on emetine, ephedrine, and the physical properties of different blood sera.—M. T. Bhaskara has elaborated a technique for making a fairly complete post-mortem examination through an incision in the upper abdomen.—R. McCarrison contributes papers on experimentally produced lymph-adenoid goitre and on the influence of irrigation on the nutritive value of rice.—S. S. Sokhey and M. A. Malandkar write upon the pancreatic function in sprue.—W. F. Harvey and K. R. K. Iyengar on the development, duration, and restoration of immunity.—W. C. Ross has two papers on cholera.—R. Senior-White, G. Covell, and Bruce Mayne have several contributions in connexion with malaria.—R. Knowles and B. M. Das Gupta record their laboratory studies on Surra, and H. W. Acton describes ainhum, a band scleroderma.

[1] THE LANCET, 1927, ii., 1285.

New Inventions.

THE SCOTOGRAPH.

THIS is an instrument designed to facilitate the fields of vision where there is a central scotoma. Field-taking is difficult where the macula of one eye is out of action. The device shown gets over most of these difficulties. A tube is bent at a right angle midway in its length, and the two arms are so arranged as to give the seeing eye a false fixation spot which will correspond in position to the real one marked on the perimeter or scotometer. The figure shows the plan of the instrument in reduced scale. E is the eyepiece. At the knuckle there is a double circle marked H, for the reception of the handle. At the extreme right-hand end of the tube is a plate, in the centre of which is cut a diamond-shaped aperture. At the knuckle of the bend of the tube is a large hole covered with a hinged lid M, fitted inside with a plane mirror. The patient holds the instrument (the instrument can be fitted with a crank arm to clip on the upright of the perimeter if preferred) before the eye which has fixation power. He sees the patch of light reflected from the mirror lid at the knuckle. The field of vision of the other eye and the scotomata are thereon mapped out. The instrument can be used for either eye.



The Scotograph is made by Messrs. J. Weiss and Son, Ltd., 287, Oxford-street, W.

N. BISHOP HARMAN, M.B., B.Chir. Camb., F.R.C.S. Eng.

Reports and Analytical Records.

SAVOY CIGARETTES.

(MESSRS. WIX AND SONS, LTD., 238–248, OLD-STREET, LONDON, E.C. 1.)

ON various occasions cigarettes have been placed on the market, the lip end of which is provided with some kind of filtering arrangement designed to hold back the moisture, pyridine, and solid particles resulting from the combustion of the tobacco. Such filters have had but little success, as they are found in some cases to impart a flavour to the smoke or they take out too much and render the smoke tasteless and devoid of character. Generally cigarettes are not smoked to the end, and the stump which is thrown away is about 15–18 mm. in length. This length acts as a filter during the time of smoking, and many of the products of combustion are retained therein. This length of tobacco is lost to the smoker, while brands of cigarettes with cardboard mouthpieces cannot be smoked with any pleasure right to the end as the last few draws possess a strong and unpleasant flavour.

The Savoy cigarettes are fitted with a "Styx" filter which, it is claimed, reproduces to a great extent the absorptive characteristics of a similar length of tobacco and shows a greater capacity for retaining the non-volatile particles that are not an asset to the aroma of the tobacco-smoke, and, moreover, are a source of irritation to the throat. No claim, however, is made for an increased retention of nicotine. When examined, the filter plugs are found to consist of three layers of crêped paper, which is not unduly absorptive. The paper is wound into a spiral, so that no central cavity remains through which a straight stream of smoke would impinge on the tongue. Between the layers of crêpe paper is a layer of cellulose fibre, which constitutes the true absorption medium. The crêpe paper and cellulose fibres are tasteless and odourless, and the end of the plug nearest to the tobacco is treated to render it non-inflammable. A further advantage of the filter plug is that no loose pieces of tobacco can enter the mouth.

We have carefully examined these cigarettes, and having submitted them to physical and chemical tests, we find that the claims described above are justified. The cigarettes, when smoked, are cool and notably less irritating to the mucous membrane than the same cigarettes without the "Styx" filter.

THE LANCET.

LONDON: SATURDAY, JULY 14, 1928.

THE RATING OF HOSPITALS.

THE answer to a question in Parliament can be generally correct without being particularly comforting. Of this nature was Sir KINGSLEY WOOD'S reply on the subject of the assessment of voluntary hospitals. A remarkable diversity of practice has arisen. At a meeting in Brighton, reported in THE LANCET last week, it was stated that in Sheffield the hospitals received special consideration, the assessment working out at £1 per bed, whereas in Brighton the Royal Alexandra Hospital for Sick Children was assessed at £14 per bed. The sums demanded from other Brighton institutions are alarming. From the Royal Sussex County Hospital, which formerly paid £100 a year, £1600 is now asked; the Children's Hospital figure has jumped from £16 to £500, and the Eye Hospital from £17 to £100.

The Ministry of Health can state correctly that the matter lies not with the central but with the local authority, that the change is not germane to the Government's new proposals for relief of agriculture and industry, and that the hospitals have all their old powers of appeal to quarter sessions against overassessment. It is equally true, however, that the hospital's difficulties are a national phenomenon and a national concern, and that no hospital is in a hurry to spend several hundred pounds on lawyers and expert witnesses in the uncertain enterprise of challenging other experts' figures. If the present rating policy involves the bankruptcy of the voluntary hospitals, the Ministry of Health must take one side or the other. If there is no intention of overwhelming the hospitals beneath the crushing weight of rating assessments, incidents like the new Brighton demands must be checked at once. This can be done either by the specific declaration of Parliament in favour of the exemption, or at any rate the special treatment, of hospitals; or else it can be done by the administrative action of the local rate-payers who must enforce their views upon assessment committees and rating authorities. As a practical step, objection must be taken to excessive hospital assessments and proposals must be made for amendment of the list. If the assessment committee can then be persuaded to give the hospitals special consideration, the rating authority and the individual rate-payer will never have the hardihood to protest against the mitigation of the hospital's burden. In this respect the hospitals are in no different position by reason of the Rating Act of 1925. It may be admitted that, technically—thanks to the good sense of the community whose interests they serve—hospitals have in the past been under-assessed, and it was always possible for objection to be taken to the leniency with which they have been treated. But the history of English rating since the time of ELIZABETH has been that the local rate-maker, being also the local rate-payer, has succeeded in adjusting the burden to his own shoulders notwithstanding the efforts of Parliament or other bodies to interfere. There is no reason why rate-payers should not spare hospitals if they want to. The 1925 Act has indirectly produced the present crisis because it has caused a general revaluation of property. Doubtless, in many cases, experts have been called in; the experts, probably paid by scale fees on final figures, have no incentive to maintain the traditional leniency towards hospitals. But the experts and the assessment committees, like the local and central authorities themselves, exist to observe the wishes of the community. There can be little doubt that it is the general wish that the work of the hospitals should not be hampered. This general wish must be made articulate and effective.

The London hospitals are not affected by this special problem as yet. The 1925 Act did not apply to London. Though this year's measures for relief of productive industry from rating burdens will touch the metropolis, the hands of the Minister of Health are, for the moment, too full for him to tackle the big task of reforming the system of London rating. London, however, cannot afford to be indifferent to the difficulties which arise elsewhere, if for no other reason than that her turn will surely come.

SUPPURATION IN THE LOWER RESPIRATORY TRACT.

THORACIC surgery has already many victories to its credit, but in spite of technical progress the treatment of suppuration in the lower respiratory tract may still be very difficult. The same is true of the differential diagnosis, and two critical reviews,[1] by BORDET and SERGENT and by ARCHIBALD, bear witness as much to the need for care and caution as to the efficacy of the methods now available. Radiology has certainly extended our knowledge of the relationship of bronchial to pulmonary suppuration. It is clear that expectorated pus must have either a bronchial or an extra-bronchial origin, and a radiogram taken after the injection of lipiodol affords a clear picture of the condition of the bronchial tree, provided the tubes are patent. Suppuration due to bronchiectasis can thus be distinguished from that due to other causes. But the help to be gained from injection of lipiodol is limited by the fact that its flow may be obstructed, so that it fails to penetrate into a diseased area. An abscess may communicate with a bronchus, but if the fistulous connexion between the two is partially obstructed by granulation tissue, as is usual, the flow of the opaque oil will stop short at the entry. We may therefore divide into two groups those radiograms revealing shadows which suggest the existence of suppuration in lungs or pleura. In the first the injection of lipiodol proves the opacities to be due to bronchiectatic dilatations; these may or may not be complicated by inflammation of surrounding structures, but the primary lesion is in the tubes. The second group comprises the films with shadows which are not penetrated by lipiodol, and these may be due to suppuration within the lung or pleural cavity. Such shadows may be homogeneous or otherwise, the existence of an abscess cavity being suggested by an area in which a dense opacity surrounds a central clearer space. If such a cavity communicates with a bronchus and contains pus, the presence of a fluid level will demonstrate the condition on the film. This appearance may be due to pulmonary abscess, encysted pyo-pneumothorax, or a suppurating cyst. The diagnosis of a large pyo-pneumothorax seldom gives rise to difficulty, but if the collection of fluid

[1] Diagnostic radiologique des suppurations broncho-pleuro-pulmonaires chroniques: Emile Sergent et François Bordet. Le traitement chirurgical des suppurations pulmonaires: Edward Archibald, M.D. Arch. Med.-Chir. de l'Appar. Resp. 1927, ii., 393–443.

is small, and especially if it is near a lung fissure, differentiation between intrapulmonary and extrapulmonary suppuration may be almost impossible. The relationship of the fluid to the parietes of the chest and to the pulmonary shadow may be of help for, as BERNOU has pointed out, a characteristic of a localised empyema is that its inner border makes a sharp angle with the parietes. The relationships of a similar collection at the base of the lung may be determined by a radiogram taken when the patient is in the Trendelenburg position, which will reveal the relations of the costo-phrenic sinus. It should not be forgotten that pulmonary abscess is a relatively common condition, whereas a localised empyema is rare.[2] Interlobar empyema is characterised by a triangular shadow, and in the transverse position this slopes in a downward and forward direction. If the pus tracks into a bronchus the appearance of a cavity with a fluid level will be seen, indistinguishable from that of a similar cavity resulting from rupture of a pulmonary abscess. Perhaps the greatest difficulty is encountered when a shadow of more or less uniform opacity is seen, when lipiodol fails to enter the area implicated, and when no evidence of cavity can be detected. This may be due to abscess or to pleural effusion. A cloudy appearance which has been likened to smoke-puffs indicates the probability of an abscess with irregular prolongations in the lung.

The treatment of chronic pulmonary suppuration is fraught with both difficulty and danger. As H. C. BALLON says, there can be no rule-of-thumb for dealing with an abscess of the lung, a bronchiectasis, or an encysted empyema as though each were a separate entity; for inflammation in the lower respiratory tract is apt to involve bronchi, pulmonary parenchyma, and pleura. The treatment of bronchiectasis depends upon the co-existence of complicating factors. If lipiodol reveals bronchial dilatation, and if there is no evidence of accompanying abscess formation, medical treatment by posture, vaccines, and attention to hygiene is indicated. In graver cases, when radiograms show that the process is extending or that ampullary dilatations make drainage by natural methods impossible, further measures must be taken. BALLON has treated 500 cases by direct aspiration, employing the bronchoscope for this purpose. Though cure can seldom be attained by this means, he claims a considerable measure of success in the alleviation of symptoms and improvement in health. He considers that bronchial lavage is dangerous and unnecessary, and though treatment of bronchiectasis by artificial pneumothorax may cause temporary improvement, it is followed by relapse as soon as the lung is allowed to re-expand. Phrenic evulsion seldom, if ever, leads to a satisfactory compression of the dilated tubes. Thoracoplasty holds out small prospect of permanent benefit and the operative mortality is high. To avoid the risks from shock C. A. HEDBLOM has devised "gradual thoracoplasty," the operation being carried out in from three to seven stages. Even with these precautions he avoids operating when cloudy shadows in the skiagram suggest that the bronchiectasis is complicated by pulmonary suppuration. Treatment which may demand seven operations, and is only applicable to uncomplicated forms of the disease, seems to have little to commend it. Lobectomy, following ligature of the bronchi and vessels of the diseased lobe, is more dangerous than thoracoplasty and no better in its results. A more hopeful method is that of E. A. GRAHAM, who practises pneumectomy by cauterisation. After resection of portions of three or four ribs and the formation of adhesions to protect the healthy pleura, the diseased tissues are removed by the thermo-cautery. Several applications of the cautery may be necessary to remove all the diseased tissues, and a mortality of at least 20 per cent. may be expected after this comparatively safe procedure—a striking commentary on the dangers attending surgical interference in bronchiectasis.

The classical operation for chronic pulmonary abscess is pneumotomy and drainage, following rib resection and the formation of adhesions to protect the pleural cavity. Immediate improvement has been the rule, but closure of the wound has almost inevitably been followed by recurrence of symptoms and further pus formation. The cause of these disappointing results has been explained by the use of lipiodol. Bronchiectasis is a frequent complicating factor in pulmonary abscess, and it is useless to drain the abscess if neighbouring bronchi are dilated and harbouring pus. E. ARCHIBALD has abandoned simple lobectomy in favour of Graham's method of cautery pneumectomy. A more extensive rib resection than that practised in lobectomy is carried out and adhesions are provoked by packing with gauze. At a second operation the abscess is opened by means of the thermo-cautery and the cavity is packed. At a later date lipiodol is injected into the cavity and a radiogram is taken to ascertain if there are any residual bronchiectatic lesions or secondary abscesses. Any further destruction of diseased tissues is carried out by means of the electro-coagulating needle. Thus, while simple pneumotomy may suffice for the treatment of acute abscess or for a simple circumscribed abscess near the surface of the lung, pneumectomy by cautery is the operation of choice for the complicated or deep-seated forms. Lobectomy may be a more radical operation but, as ARCHIBALD remarks, a living man with a fistula is worth several dead men cured by lobectomy. The operative mortality for the latter operation is given as 57 per cent.

[2] See THE LANCET, 1928, i., 1336.

DEAFNESS AND INDUSTRIAL DISABILITY.

TOTAL deafness, or anything approaching total deafness, is a far more terrible affliction than is easily realised by the general public, but unlike blindness, it does not make an immediate and universal appeal to compassion. It is a familiar fact that a blind man instantly excites our pity, while a deaf one is somewhat annoying. The consequence is that, of all forms of charitable effort, the agencies which have long striven to help the deaf in this country are about the worst supported. The skilled assistance which can be given to the totally deaf will usually turn them rapidly into people who can be valued and self-supporting members of the community; but this assistance is by no means always forthcoming, and the standard of our care for the deaf is lower than for almost any other comparable class of afflicted people. Those who are deaf from birth, or become severely deaf at an early age, are also necessarily dumb. Of these it is reckoned that there are about 40,000 in Great Britain, but there are no satisfactory statistics to show the number—certainly far greater—of those who become so deaf later in life as seriously to interfere with their employment. For deaf children, up to the age of 16, local education authorities, and the Education Department, have been doing for many years extraordinarily good work. These children, however, when they leave the special

schools, together with all who have become deaf in later life, are at a great disadvantage in finding employment. It is true that many agencies, mostly missionary societies, exist for the purpose of giving them help, but these have great difficulty in obtaining funds, and they are unable to assist more, at most, than half the deaf people who are in need of their services. Of those who have become deaf after childhood, men whose deafness was brought about by the war are dealt with by the Ministry of Pensions, and on the whole quite adequately; but for the far larger number who have become disabled in civil life there is virtually no help at all.

All this was admirably stated a few weeks ago by Lord CHARNWOOD, who performed a notable service to deaf people by raising the question in the House of Lords, when he asked the Government to institute an inquiry. It is much to be regretted that Viscount GAGE, for the Government, was unable to accede even to this modest request, chiefly on the ground that, if machinery like that set up to deal with the blind is applied to all congenital affections, the Ministry will have a great financial load placed upon it. It is perhaps some consolation that this reply appeared to be unsatisfactory to his hearers; indeed, Viscount HALDANE raised the criticism that it had been prepared before the debate came on, and before anybody could know what was going to be said. It is a waste of money to teach deaf and dumb children, unless there is adequate machinery to assist in their employment when taught, and it is probable that Government assistance to the existing societies would prevent much of this waste at little cost. In any case, the inquiry asked for would cost little or nothing, and would do much good by stimulating public interest where it is sorely needed.

PRESENTATION TO SIR GEORGE MAKINS.

ON Wednesday, June 20th, in the Governors' Hall at St. Thomas's Hospital, Sir George Makins was presented with his portrait, the gift of his friends, pupils, and colleagues. The painting is by Mr. James S. Sleator and is a sound piece of work. The proceedings, which were quite informal, were opened by Sir Arthur Stanley, treasurer of the hospital, with a few warmly appreciative words on behalf of the governors. He was followed by Sir Percy Sargent, Sir Cuthbert Wallace, and Dr. H. G. Turney, who as friends and colleagues of different periods dwelt in turn on the length and value of Sir George's services to the medical school and hospital, and on the affectionate regard in which he was held by all with whom he was associated. Special reference was made to Lady Makins who had taken so large a share in establishing and maintaining these kindly relationships. Sir George, in reply, expressed his profound appreciation of the honour done to him.

All the medical profession will unite in appreciation of the action taken by St. Thomas's Hospital, for Sir George Makins, though a great St. Thomas's man, is a representative of the best scientific and professional development which medicine throughout our country—and the world—has seen during the past half century. His work commenced when the verities of the Listerian teachings had been established, and he has been a leader in all the advances which followed—advances which, while they were most openly reflected at first in the enlarged scope of operative surgery, have since revolutionised the whole of medical work. How clearly throughout this onward march Sir George Makins has been recognised as a protagonist is shown by the high responsibilities which have at different times been laid upon him by his country and by his colleagues as man of science, practising surgeon, and wise administrator.

Annotations.

"Ne quid nimis."

THE BRITISH MEDICAL ASSOCIATION'S ANNUAL MEETING.

FORTY-THREE years have elapsed since the British Medical Association last visited Cardiff, and the annual meeting which opens there in ten days' time will be the ninety-sixth in its history. Sir Ewan Maclean, the incoming President, will give his address on the evening of Tuesday, July 24th, and the scientific sections will meet, as usual, on the three days following. Their programme from year to year shows the gradual enlargement of the scope of medicine, and the task of selecting subjects grows ever more embarrassing. Nevertheless, the organisers have once again succeeded in arranging meetings that reflect many of the main tendencies of medicine—and especially clinical medicine—at the present time. While the physicians are to discuss diseases of the coronary arteries, the prevention and treatment of diphtheria, and the problem of acute nephritis, the Section of Surgery will consider such subjects as pancreatitis, the diagnosis and treatment of spinal cord tumours, the treatment of gangrene, the diagnosis of ureteric calculi, and (with the Section of Radiology) the fallacies of radiography in abdominal diagnosis. The vexed questions of unsuccessful forceps cases and sterility will again be raised at the Obstetrical Section, which will also hear papers on other topics, whilst the Section of Mental Diseases and Neurology will devote its attention to autotoxæmia in relation to the causation of psychoses, the differential diagnosis and treatment of cerebral states following head injuries, and the early treatment of psychoses and psychoneuroses. Of special interest at the present time will be the discussion at the Pathological Section on encephalitis occurring in the course of virus disease and the exanthemata, and another occasion of importance in connexion with vaccination will be the session devoted by the Section of Preventive Medicine to the value of present methods of controlling infectious diseases. Without reproducing the entire programme it is impossible to give a fair idea of the topics chosen for discussion, ranging as they do from the medical treatment of gastric disease to the decline of the birth-rate. Enough has been said, however, to show their catholicity and their appropriateness. The meetings will be held in the mornings, and will be interspersed with dinners, receptions, excursions, and other social events. As usual, the meeting of representatives of the Association will be held before the scientific sessions, and it will open on the morning of Friday, July 20th.

LITTLE FLEAS AND LESSER FLEAS.

THE aggregation of man into concentrated communities has produced most of the problems with which modern hygiene has been mainly concerned. In nature hosts and parasites have generally come to some sort of stable balance with "live and let live" as its motto. Of this we should know more if we understood the parasitology of wild animals better; trypanosomes in game in Africa and Gaertner's bacillus in rats at home are familiar examples. Similarly, when vegetable crops are grown over wide areas in more or less pure culture, special troubles with parasites generally arise. This is particularly apt to happen when the plant itself has been moved from its natural home; coffee, for example, and rubber and bananas and oranges are now grown all over the world where climatic conditions are appropriate. Along with this transportation of hosts there has been a dispersion of parasites, and out of the troubles that have come from upsetting the balance natural to any country has arisen an extraordinarily interesting chapter of biology. The parasites of a plant are, it seems, normally controlled

and kept within bounds by a second series of parasites, and these again sometimes by a third. In the moth *Pyrausta nubilalis*, for instance, something of a pest to corn in Southern Europe and a serious injury in the United States since its introduction in 1910, 18 parasites (mostly insects) have been found to make their living on the larva, one on the egg, and two on the chrysalis.

If a parasite gains access to a new country without its own parasites it is obviously in a very advantageous position, of which it may make full and foul use, and similarly the multiplication of a host on an unprecedented scale may give parasites a chance to increase beyond the controlling powers of the secondary parasites. The plain remedy is to encourage or introduce the parasites of the parasite, and in a number of instances this plan has been put into operation with signal success. An Australian ladybird, for instance, has proved a perfect remedy for the cushion scale of oranges and lemons in California, Portugal, South Africa, Egypt, and elsewhere. A chalcid wasp from South Africa similarly controls the black scale insect in California, and the Italian silk industry has been saved from ruin by importing a parasite of the scale insect which destroys the mulberry trees. Plants which grow too profusely have in the same way been brought within bounds by importing insects which feed on the seeds. The problems involved are very complex, and Dr. W. R. Thompson, who works at the laboratory maintained at Hyères for the purpose by the United States Government, contributes a thoughtful survey of the ramifications of interrelationships which are involved to the last number of *Parasitology* (1928, vol. xx., p. 90).

The general principles discussed are applicable to many problems of human hygiene, and the details have, of course, a very intimate bearing on the control of the insects which carry disease and of human parasitic worms. Some years ago an ingenious suggestion was made by Dr. B. S. Elgood and Major T. Cherry [1] that bilharziasis in Egypt might be controlled by encouraging the native population in the villages to keep ducks. The suggestion arose from the observation that the snail, which is the intermediate host of the bilharzia, is absent from those ponds and lakes to which ducks have free access, whereas they are abundant elsewhere. It would be interesting to learn whether this scheme was ever tried out. d'Herelle would have us believe that bacteria may be curbed by encouraging his *Protobius bacteriophagus*: it may be so. But it is certain that African sleeping sickness will ultimately be controlled only by finding out how the tsetse-fly lives and moves and has its being; by discovering its parasites and other difficulties and increasing them; and by ascertaining its favourite food and the conditions of life which it likes, and by destroying them.

THE INFLUENCE OF DIET ON HÆMOGLOBIN REGENERATION.

So sensational were the results of the application of the liver treatment to primary anæmia that a more or less universal disappointment was experienced when its effects in secondary anæmias were pronounced to be slight. In fact, the indefinite results in these cases as compared with the remarkable improvement induced in cases of primary anæmia led many observers rather hastily to conclude that liver is without effect in any type of anæmia other than the primary or Addisonian. Further experience has caused most of those who have investigated the matter to modify their views, and clinical experience is beginning to show that liver is not without beneficial effects even in the secondary anæmias. Prof. G. H. Whipple has been able to show that in experimental animals liver has indeed a powerful effect in inducing hæmoglobin regeneration in secondary anæmia. This effect is not confined to liver but is shared in lesser degree by many other foodstuffs. In the June issue of the *American Journal of the Medical Sciences* Prof. Whipple summarises the results of tests on various articles of diet carried out under his direction in the Department of Pathology of Rochester University. The experiments were made on dogs brought to a standard degree of anæmia by repeated bleedings, and they appear to have been subjected to rigid control. Of all the articles of diet tried beef liver produced the most rapid regeneration of hæmoglobin; second to this came beef kidney, and then chicken gizzard, the index of which works out at 85, compared with 100 for beef liver. Chicken liver had a powerful effect, but fish liver appeared incapable of producing the slightest regeneration of hæmoglobin. Prof. Whipple found various vegetable substances to be effective, though none of them to the same extent as mammalian tissue. Thus apricots, apples, raisins, and prunes all showed considerable power; raspberries were as inactive as fish liver. "The leafy vegetables," says Prof. Whipple, "have a reputation much better than they deserve. . . . We can furnish no evidence of unusual blood regeneration following liberal diets of various greens. Beet greens, spinach, asparagus, and lettuce all show values of between 5 and 20 g. hæmoglobin production per two week period above the control level," as opposed to 100 for beef liver. Iron in the form of ferric citrate was found to bring about a material increase in hæmoglobin formation but the response was improved by the addition of liver; it was possible to demonstrate a liver reaction superimposed upon an iron reaction. Prof. Whipple appears to have come to the conclusion that the favourable results produced in secondary anæmia by the exhibition of suitable dietary factors, of which liver is only one, is due not to the activity of any hormonic substance but simply to the supply of the building-stones in the form of suitable amino-acids necessary for the elaboration of hæmoglobin. That the hæmoglobin of the muscle may be called upon to a limited extent to supply deficiencies of the blood hæmoglobin is a further observation arising out of this work. It has been shown, however, by biological tests that the hæmoglobin molecules derived from different tissues are not identical. It is probable that muscle hæmoglobin must be completely broken down before it can be utilised for building up blood hæmoglobin. These experiments are likely to help in the elucidation of the biochemistry of the blood as well as in therapeutics, and we trust that they will be continued and extended.

ULCERATIVE COLITIS.

THE bacteriology of chronic ulcerative colitis still gives rise to lively controversy. In 1924 J. A. Bargen reported from the Mayo Clinic that he had found a Gram-positive diplococcus in 90 per cent. of cases, and vaccines prepared from the organisms have been used at the Clinic with apparent success in treatment of the condition. But although Bargen found that freshly isolated cultures of the diplococcus produced diarrhœa and ulceration of the colon in rabbits and dogs, other workers have not wholly accepted his organism as causal; M. Paulson, of Baltimore, for instance, has reproduced the disease with various strains of streptococci which appeared in diplococcal form when freshly isolated. E. MacNaughton,[1] of Montreal, now brings forward support for Bargen's view by reporting the association of a diplococcus with five cases of ulcerative colitis, one of these cases being especially interesting because the appendix was removed after ileostomy, and in its mucosa there was an unruptured abscess from which a pure growth of Gram-positive diplococci was obtained. The characters of Bargen's diplococcus are identical with those of the "enterococcus" which French bacteriologists have long regarded as pathogenic, causing enteritis in infants and adults, and some forms of

[1] THE LANCET, 1919, ii., 636.

[1] Canad. Med. Assoc. Jour., 1928, xviii., 538.

meningitis, and appearing as a secondary invader in cases of tuberculosis and paratyphoid fever. This organism was prevalent in the "fæcal infection" of wounds sustained on the Flanders front and on Gallipoli in 1915. It seemed to be of low virulence, but gave rise to a chronic indolent inflammation on invading the damaged muscles. Accidental infection of operating surgeons and laboratory workers occurred several times; the cases were slow in evolution but resistant to treatment. After the inoculation of large doses of killed organisms as vaccines in healthy persons no immunity reactions could be demonstrated. This diplococcus may need to be watched for as a secondary invader, but the primary ætiological factor in chronic ulcerative colitis is, we feel, as yet undiscovered.

THE COW AND UNDULANT FEVER.

IN the Court of Public Health the cow frequently stands in the dock on the charge of conveying disease to man. On some counts she eventually secures an acquittal—for instance, as a sufferer from scarlet fever—while on others, and particularly tuberculosis, a fair but protracted trial has resulted in a verdict of guilty with extenuation as regards the amount of disease transmitted. Fresh diseases, however, continue to be laid to her charge; for example, the last few years have shown that food poisoning of the salmonella type may sometimes be traceable to bovine infection, members of this group of bacilli being excreted in the milk.

The most recent indictment is that the cow is a source of undulant fever in man, and this involves consideration of an interesting field of veterinary-medical pathology. Malta fever, or undulant fever as it is now more generally called, was shown by Bruce in 1887 to be due to an organism called by him *Micrococcus melitensis*. Its relationship to infected goats and goat's milk was subsequently established. About 1897 Bang in Denmark showed that a bacillus named by him *Bacillus abortus* was the causal organism of contagious abortion in cattle. For many years no relationship between the two organisms was even suspected, and it was only after a further decade that comparison of the two types showed their extremely close agreement. This comparison was made by Miss A. C. Evans, of Washington, who further showed that infection with the organism of Malta fever tends to produce abortion in goats, whilst in later experiments she found that inoculation of cows with strains from human cases of Malta fever results in abortion. These findings have been confirmed and amplified by a number of other observers. In a further report in 1923, after a study of many types, she finds that strains of the *melitensis-abortus* group isolated from five species of animals fall into two distinct serological types which are closely related. One type, which may be called the *abortus* type, is characteristically bovine and porcine; the other, which may be called the *melitensis* type, is characteristically human and caprine. The types are not, however, restricted to special host species. The general opinion which is gaining ground is that *melitensis* and *abortus* are not distinct bacteriological species, but merely distinct serological types of the same species. *B. abortus* is not uncommon in England, and Wilson and Nutt in 1926 have recorded its presence in cow's milk in this country. In a recent paper Dr. P. Manson-Bahr[1] gives a summary of four sporadic cases of undulant fever in this country, most of which were not explicable on the grounds of infection with goat's milk. In addition he gives particulars of two further cases of his own, both of which were probably due to infection through cow's milk. He suggests that other cases might be found by closer observation of districts where bovine abortion is endemic.

At the last meeting of the permanent committee of the Office International d'Hygiène Publique it was reported that work in Sweden and Denmark had confirmed the view that *B. abortus* is the causative agent of undulant fever, and it was stated that this infection, "propagated by milk or cattle, is shown to be more frequent in the latter country than typhoid and paratyphoid fever." A good many obscurities remain, however, which can only be cleared up by further investigations. For example, a considerable percentage of sera from persons not suffering from disease give a serological reaction with *B. abortus* antigen. The significance of this has not been established. Contagious abortion in cows is common in certain areas while human infections are probably rare. This may be because in infected cows *B. abortus* is only present in quite small numbers in the milk, or it may be a question of low virulence to man. The general position may be summed up by saying that the evidence goes to show that there is a risk of undulant fever being transmitted through drinking raw infected cow's milk, but as yet insufficient data are available to measure the extent of that risk or even to show if it is more than remote.

[1] Abhandlungen aus dem Gebiete der Auslandskunde, Hamburgische Universität, Bd. 26, D, Medizin Bd. 2.

THE NEW ZEALAND HOSPITAL SYSTEM.

By way of an appendix to its annual report the New Zealand Department of Health has issued an elaborate survey of the hospital system of the Dominion, called forth mainly by the recent considerable increase in expenditure. The New Zealand hospitals are maintained partly out of the rates, partly by Government subsidies, and, to a much smaller extent, by voluntary contributions, which relieve the rates but not the taxes. Notwithstanding that help, even in comparatively slender degree, is derived from private sources, the document adopts a rather scornful attitude towards the voluntary system, which it describes as based upon "sentimental appeals." The Health Department is satisfied that the hospital arrangements of the Dominions are "unique," and that no real improvement in the financial method of maintenance has yet been proposed. In one respect, however, something less than perfection has been attained. "The only fault in the hospital system of New Zealand arises out of the number of hospital districts," and it is recognised that it is desirable to have thoroughly equipped modern hospitals serving larger districts, although the cost of even one such institution in each of the 47 districts would be prohibitive. Therefore, not only must no new districts be created, but existing ones must be amalgamated, a process which is greatly hampered by "selfish and parochial" opposition. Even under the system which is thus admitted to be imperfect, the cost of the hospitals has gone up by 150 per cent. in the last ten years, for much the same reasons that have operated in England. There has been a notable increase in the number of beds, which have grown from 5929 in 1923 to 7060 in 1927. The explanation of this expansion is that in New Zealand, as elsewhere, a greater proportion of the population is using the hospitals. This tendency of all classes to resort to the hospitals is held to show that there is no real need for the provision of private wards, though the Department of Health would be willing to see at least one hospital try the experiment. In one respect the New Zealand hospitals differ materially from those in the Motherland. In the Dominion the out-patients are fewer, in proportion, than the in-patients: there is, however, a tendency to develop the out-patient departments of the general hospitals. Upon the difficult question of the payment of medical staffs the Survey is emphatic. The Director-General of the Department is definitely of opinion that "the time has come for the abolition of the honorary staff," and he lays it down that "the honorary system is only suitable for hospitals treating only pauper patients." Neither the New Zealand branch of the British Medical Association nor the Dominion's Hospital Boards Association has expressed quite so sweeping a view, and so far no action has been taken.

THE TREATMENT OF ILEUS BY SPLANCHNIC ANÆSTHESIA.

ACUTE ileus, whether due to some mechanical obstruction, to atony, or to spasticity of the intestinal musculature, is one of the complications most dreaded by the surgeon. Numerous methods of treatment have been tried, both operative and therapeutic, and have recently been reviewed in our columns[1] by Mr. A. H. Southam. In a certain percentage of cases enterostomy is successful, but sometimes neither fæcal matter nor gas is discharged through the enterostomy opening and no relief of symptoms ensues. The suggestion that ileus might be satisfactorily treated by blocking the splanchnic nerves has recently been made by A. Ochsner, L. M. Gage, and R. A. Cutting,[2] as a result of a series of carefully conducted experiments on animals. The suggestion has a sound theoretical basis. Bayliss and Starling showed that physiological ileus could be abolished by resection of the splanchnics, and P. Rosenstein and H. Kohler found that procaine hydrochloride solution introduced into the splanchnic area of rabbits produced peristalsis. In those cases of paralytic ileus which are due to the inhibition of intestinal mobility from impulses passing by way of the sympathetics, the blocking of the reflex arc should abolish the inhibition. This mechanism accounts for the good results obtained by continental surgeons from the use of spinal anæsthesia. The procedure is not, of course, applicable to cases of mechanical obstruction where, in the early stages, there is no interference with the contractibility of the intestinal musculature. In any case spinal anæsthesia is not without its dangers. Splanchnic anæsthesia appears to be a safer procedure. Ochsner and his co-workers adopted the method devised by M. Kappis, using a 1 per cent. solution of procaine hydrochloride injected into each side at the lower border of the twelfth rib. Their experiments showed that splanchnic anæsthesia will produce peristalsis in physiological, chemical, and mechanical ileus in dogs, and there seems no reason why it should not be applied clinically to cases of paralytic ileus following operation, or to those which arose from mechanical obstruction, but do not clear up when the obstruction is relieved. Even when enterostomy has been performed, splanchnic anæsthesia might be valuable when toxæmia persists owing to the continued paralysis of the musculature and the inability of the intestine to expel its contents. The advantage of the Kappis method is that the abdomen need not be opened, the splanchnic area being approached through the retroperitoneal space and not through the peritoneal cavity. Reports as to the results of clinical trial of this method will be awaited with interest.

THE TAXING OF KNOWLEDGE.

Captain Ian Fraser's attempt to introduce into the Finance Bill a clause exempting scientific films from import duty met with the blankest *non possumus* from the Financial Secretary to the Treasury and only a faint hope was held out by the Chancellor of the Exchequer. The answer of officialism is that exemption would be "difficult and indeed almost impossible to administer." For ourselves we entirely decline to believe that it is beyond the power of expert draftsmen to frame, or of sensible civil servants to operate, a clause exempting films which are wholly educational in character. Exactly the same discrimination is applied elsewhere in connexion with the entertainments duty, and there is not the slightest reason why, as Captain Fraser suggested, the customs officials should not be satisfied with the certificate of the Royal Society, the British Medical Association, the Royal Astronomical Society, or other accredited body of the same sort. The Privy Council Committee for Scientific and Industrial Research seems a suitable organisation for the purpose. Nor need the proposed exemption cause a multiplication of officials; the country is evidently well equipped with personnel. Prof. H. H. Turner recounted, in a letter published in the *Times* of July 3rd, the experiences of a distinguished American astronomer who came over to lecture to the Royal Astronomical Society on the atmospheres of the planets and who brought with him two cinematograph films of the successive phases of Jupiter. He produced the films from his luggage at Victoria Station, explaining their nature and purpose. The films were impounded. Help was sought, says Prof. Turner, from the Royal Observatory, and the customs officer was assured of the integrity of the lecturer and his scientific purpose. Next morning Mr. A (the officer thus assured) introduced the lecturer to Mr. B in an adjoining office, who gave him papers to be carried to Mr. C elsewhere, who arranged for a meeting with Mr. D in the afternoon, as the result of which an order was made for removal of the films to the Bonded Film Stores in Endell-street. There the lecturer explained the situation to Mr. E, who introduced him to Mr. F, who sent him back to Mr. C, who referred him to Mr. G, who gave him an order on Mr. F for delivery of the films at Endell-street, on payment of duty. This occupied two days; part of the third day was devoted to official arrangements for return of one of the films (a reserve film) to America; the total expenses were about £4, including a fine of 2*s*. 6*d*. for the alleged offence of carrying "merchandise" in a trunk. What the distinguished American astronomer may have thought at this British adaptation of Ellis Island procedure—for fear a little scientific knowledge should creep into this country untaxed—is not recorded. What the opinion of the English public will be we would venture to guess. The use of the cinematograph in revealing to the medical profession the latest results of foreign research needs no emphasis. The Exchequer and the customs officials are the country's servants and not its masters. They must find some means of doing even what is "difficult and indeed almost impossible."

OXFORD OPHTHALMOLOGICAL CONGRESS.

THE eighteenth annual meeting of the Ophthalmological Congress, held last week at Oxford, was attended by about a hundred members. On Thursday Dr. Leonard Hill opened a symposium on ultra-violet rays, dealing principally with the physics of the subject. In disease, he said, the beneficial action of the rays depended upon appropriate dosage, too large doses being liable to do harm. Healthy subjects, on the other hand, were subject to comparatively little risk. How the beneficial effect is produced remains to a great extent a mystery. It has, however, been definitely proved that one effect is to increase the bactericidal action of the blood and further, that minute amounts of ergosterol are activated by the rays to produce vitamin D. Dr. N. S. Lucas gave his experience at the Zoo and at the Lister Institute where the rays have been proved to be curative for rickets in monkeys. As to their application to ophthalmic therapy not much was said. Friday's programme included a paper by Mr. Burden Cooper on the spectroscopy of the crystalline lens. The ash shows traces of various metals, and it may be significant that there is considerably more calcium in the ash of cataractous lenses than in that of normal ones. A discussion on sympathetic ophthalmia was opened by Mr. Harrison Butler. Recent advances are in the direction of diagnosing the disease in the exciting eye before the sympathising eye has become affected, the main points of interest being how far the differential blood count is a valuable diagnostic sign and how far the evidence of the slit-lamp is of practical service in diagnosis. Mr. Harrison Butler had not found the former of much service and relied chiefly on the latter. Mr. S. H. Browning and Mr. M. Hepburn joined in the discussion. The latter recalled his paper on the subject read to this congress

[1] THE LANCET, 1928, i., 41.
[2] Jour. Amer. Med. Assoc., June 9th, p. 1847.

in 1926 and stated that in possible cases of sympathetic disease he always had a blood count taken, and if it were positive began the injection of arsenical compounds at once. The discussion was followed by the delivery of the Doyne Memorial Lecture by Prof. Arthur Thomson, whose subject was "Observations on the Eyes of Birds" and his main thesis a theory of the function of the pecten, a structure which has been a mystery to anatomists for 250 years. The theory is that the pecten, being a deeply pigmented body and being lined with a thin hyaloid membrane, acts as a dark mirror, reflecting objects from a direction other than that of the bird's flight on to the retina, and avoiding dazzle. The suggestion was made that it acts as a sort of periscope, causing the bird in its flight to be aware of any bird of prey hovering above him in the sky. The demonstrations included an ingenious apparatus for educating the amblyopic eye of young children by Mr. E. Maddox, a selection of Hamblin's fundus drawings demonstrated by Mr. Rayner Batten, different applications of the duochrome principle to refraction and other ends. Lighter items of the programme included a garden party, at which Prof. and Mrs. R. A. Peters, of Trinity College, were hosts, the annual dinner at which Sir Farquhar Buzzard, the new Regius Professor of Medicine, was the chief guest, an excursion to the Morris Motor Works, and the inevitable photograph.

THE ALCOHOL PROBLEM.

THE effect on the sobriety of the nation of the restrictions on the production and sale of alcoholic liquors during the war was discussed by Dr. H. M. Vernon in an address delivered to the Society for the Study of Inebriety on July 10th. According to him the most important feature of the control was the regulation of the hours of sale. When no liquor could be obtained before mid-day or between 2.30 to 6 P.M., it was, for the most part, taken only with food and was thereby rendered much less harmful. The arguments in favour of the limitation of the hours during which public-houses are open and of the taxation of wines and spirits, according to their concentration, are well set out in Dr. Vernon's recent book,[1] which we commend to anyone who wants to know what has been achieved and to reflect how further progress may be made. It is a plain, easy, straightforward account of the physiological effects of alcohol and of the various systems of regulation and prohibition which different countries have tried, with their results, including the improved public-house. Dr. Vernon is an experimentalist and with the aid of numerous tables and diagrams he appeals continually to experience: the efficacy of the operations of the Liquor Control Board is measured in the same spirit as that which moves him to determine how much whisky of what strength he must drink before he can no longer work a typewriter. He probably has some general prejudices on the subject, but he keeps them out of sight as much as any man may, and it is only because he tells us so that we know he is one of those really moderate drinkers who are the despair of the ardent teetotaler. Of complete prohibition as a practical proposition for to-day he thinks poorly, and he attaches much more importance to control based on the physiological facts, ascertained by experiment, that alcohol is less intoxicating if it is taken when the stomach contains food and if it is well diluted. He advocates, therefore, a stringent pursuit of the plan at present prevailing in this country of making alcohol easily available only round about meal times and, by differential taxation, making concentrated alcohol more expensive than dilute. He would indeed exaggerate the difference by cheapening beer which contains as little as 3 per cent. of alcohol on which it is almost impossible for anyone of a normal capacity to get drunk.

[1] The Alcohol Problem. By H. M. Vernon. London: Baillière, Tindall and Cox. 1928. Pp. 252. 9s.

THE PROGRESS OF DERMATOLOGY.

THE May number of *American Medicine* is consecrated to dermatology, and among a heterogeneous collection of original papers is one by Dr. E. L. McEwen, of Chicago, which admirably assesses the progress of the last ten years and helps to clarify the subject for practitioners, to whom the thesis is addressed. "What does the general practitioner see in dermatology?" asks Dr. McEwen. "He sees a jungle, to him more or less impenetrable, with trails that are poorly blazed, devious, full of pitfalls, and leading more often to denser thickets than to open spaces." The metaphor could hardly be better chosen, for there is no branch of medicine in which progress has been more sudden. Before the discovery of the spirochæte there was an increasing tendency towards portentous nomenclature, serving chiefly as a ragged veil to ignorance. With the solution of many ætiological problems, among which may be mentioned the tuberculides and eczematoid ringworm, and the recognition of the importance of focal sepsis and allergy in cutaneous manifestations, the veil is lifting, and if progress is maintained at the same rate it is reasonable to hope that before long we may be in a position to throw light on psoriasis, pemphigus and mycosis fungoides. The elucidation of the problem of eczema is well under way, and Dr. McEwen accepts the differentiation of dermatitis as opposed to eczema by relegating to the former all cases that are clearly of external causation, or "nearly so," classing in the eczematous those cases whose cause is suspected of being purely internal. He draws attention to the reduced likelihood of any given eruption being syphilis, which a generation ago had a statistical frequency of over 11 per cent., and was second only to eczema among dermatological diagnoses. In this branch of medicine the introduction of various chemotherapeutic remedies, such as salvarsan and the X rays, radium and ultra-violet rays, have greatly strengthened our hands of late years, and the journal under review bears witness to a new and hopeful outlook.

DEATH OF DR. POTTEVIN.

MEDICINE in its broadest sense has lost a good friend by the death on July 6th of Dr. Henri Pottevin, Director of the Office International d'Hygiène Publique. He had a cerebral hæmorrhage shortly after the May session of the Permanent Committee and a second last week which proved rapidly fatal. Effective international health work has many difficulties, but as far as the Office International was concerned these were surmounted by the ardent, quick-brained Frenchman of the Midi who had a positive genius for consolidating and interpreting the contributions and opinions of men from other countries and of combining them, wherever it could be done, into logical statements and agreements. Henri Pottevin was in his sixty-third year, a doctor of medicine and science, a collaborator of Pasteur in his early days, and always in touch with the Pasteur Institute. He was director of the health office of the town and port of Havre for some years, and was appointed general secretary of the Office International from the date of its foundation in 1907, succeeding Cazotte as Director in 1926. He had many other activities, notably as a Professor in the Conservatoire des Arts et Métiers in Paris, and he had an active political life which led to his being appointed a Senator of his native department, Tarn et Garonne. He left the Senate only last year. From the British point of view he will perhaps best be remembered in connexion with the various official conferences at which the successive international sanitary conventions relating to infectious disease and quarantine were concluded. In that of 1912 he was rapporteur for all technical questions, and in the recent conference of 1926 he was rapporteur général and, in point of fact, the management and satisfactory conclusion of that international instrument could never have been achieved without him. Much had been hoped from

his appointment, immediately after that conference, as director of the Office International, especially since he had seen this organisation grow from being representative of a small number of countries to one to which practically every Government now officially adheres, and whose Permanent Committee accepts the additional responsibility of advising the Health Organisation of the League of Nations. He will be remembered gratefully by those who, towards the end of the late war, used to attend the Inter-Allied Sanitary conferences for comparison of data regarding the prevention of disease in the different allied forces.

THE International Cancer Conference meets in London from July 16th to 20th. Delegates from nearly every important medical school and university in the world will attend its scientific meetings, which are to be held at the houses of the Royal Society of Medicine and of the College of Nursing. Owing to the limited space only a small number of tickets of admission are available, for which application should be made to the Secretary of the Conference, at the Royal Society of Medicine, 1, Wimpole-street, London, W. 1.

Sir Robert Philip, Professor of Tuberculosis in the University of Edinburgh and President of the British Medical Association, has been awarded the Trudeau Medal of the American National Tuberculosis Association. This medal is given annually to the person who has made the most meritorious contribution to the knowledge of the cause, prevention, and treatment of tuberculosis.

ROYAL SANITARY INSTITUTE.

ANNUAL CONGRESS.

THE thirty-ninth congress of the Royal Sanitary Institute will be held at Plymouth in the Guildhall and Council Chamber by invitation of the municipal authorities during the week ending July 21st. Delegates have been appointed by the principal Government departments dealing with health and sanitation, while all parts of Great Britain will be represented by sanitary authorities, societies, and universities. Representatives from our dependencies, from the United States, and the principal countries of Europe will also be present. The reception room will be opened in the St. Andrew's Abbey Hall at noon on Saturday, July 14th, and on the following day, Sunday, there will be a service at St. Andrew's Church in the morning and one at the George-street Baptist Chapel in the evening. Following the reception of members and delegates by the Mayor, there will be a public luncheon in the Royal Hotel, at 1 P.M. on Monday, July 16th; the opening of the Health Exhibit will take place in the Drill Hall in the afternoon, and the inaugural address will be given by Viscount Astor, the President of the Congress, in the Guildhall, at 5 P.M. The work of the sections will be spread over the following Tuesday, Wednesday, Thursday, and Friday, the Presidents being: Preventive Medicine, Dr. L. Rajchman, Medical Director and Secretary of Health Committee of the League of Nations; Maternity and Child Welfare, including School Hygiene, the Viscountess Astor, M.P.; Personal and Domestic Hygiene, the Mayoress of Plymouth; Hygiene of Food, the Prime Warden of the Worshipful Company of Fishmongers; Hygiene in Industry, the Rt. Hon. Ramsay MacDonald, M.P. Other sections include veterinary hygiene, engineering, and architecture, and there will be conferences by representatives of port sanitary authorities and National Health Insurance societies as well as of medical officers of health and health visitors. Among the large number of important subjects to be discussed are: tuberculosis, scarlet fever and measles, puerperal fever, fœtal mortality and injuries, the rheumatic child, the influence of environment on the mental health of the child, factory conditions, cremation, housing, and humane methods of cattle slaughter. A popular lecture will be delivered on the evening of Friday by Prof. W. E. Dixon, of the Pharmacological Laboratories, Cambridge, the subject being Poisoning in Daily Life. Both on Friday and on Saturday there will be excursions to various places of interest in connexion with health and sanitation. The offices of the Institute are at 90, Buckingham Palace-road, London, S.W., and the local offices are at the Town Hall, Stonehouse, Plymouth.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCLXXXIV.—TREATMENT OF MIGRAINE.

MIGRAINE may be defined as a periodically recurring nervous disturbance of which the essential element is headache. But in its classical form it presents a much more complex syndrome; the headache is usually unilateral, and in at least half the cases is preceded by symptoms indicating disorder in localised portions of the cerebral cortex of the side on which the headache is situated; the headache is accompanied by nausea, and after a number of hours vomiting occurs, and this ushers in the last stage of the attack which typically comes to an end in sleep. This symptom-complex is frequently accompanied by a slight mental change and most commonly this takes the form of irritability and depression. The symptoms of localised cerebral disturbance are usually of a sensory nature; hemianopia is the commonest and with it often go scintillating spectra in the dim half of the field; next in frequency come paræsthesiæ in one side of the face and tongue and in the corresponding hand and arm, while auditory disturbances, vertigo, and slight aphasia are not very uncommon. Motor disturbances in migraine are extremely rare, and apart from vague ephemeral pareses of the fingers the only kind of paralysis that is encountered is a palsy of one or more of the oculo-motor nerves. The occurrence of such a palsy during a migraine attack constitutes the so-called ophthalmoplegic migraine. It is only in very rare cases that this complication occurs, but when it does the patients may suffer from it with many of their attacks; the paralysis lasts a few days or even weeks, and diminishes gradually only to be renewed with the next paroxysm. Another atypical form of migraine results from a variation in the quality and perhaps also in the site of the pain, so that instead of being a unilateral headache it becomes a neuralgia in the cheek or temple.

Ætiology and Diagnosis.

Migraine is often hereditary; in a large number of cases it comes on at or before puberty, and in 80–90 per cent. of cases it has begun by the time the subject has reached the age of 25. Many sufferers have their own convictions in regard to its causation, but these views are very divergent, and it must be admitted that we simply do not know the cause or nature of this ailment. There is, however, almost a consensus of opinion that it arises in some way from a functional disorder of the vegetative nervous system; this view accounts for the close association between the onset of attacks and disorders of the alimentary canal, while the pallor of most of the patients during their attacks certainly indicates that the vaso-motor system is involved. If this theory is correct the action on the cerebral cortex whereby the sensory symptoms are produced must be a very indirect one, since the cortical blood-vessels are devoid of vaso-motor nerves. Another theory is that the foramen of Munro on one side becomes blocked and that the cerebral symptoms are a consequence of the distension of the hemisphere that results from the continued secretion of cerebro-spinal fluid into the closed lateral ventricle. Some writers, notably F. G. Crookshank, have regarded migraine as a psycho-neurosis, but this suggestion has not found wide acceptance, and it seems inadequate to account for such a symptom as ophthalmoplegia.

The sensory accompaniments distinguish migraine from other forms of headache, and if they are absent its unilateral distribution and the paroxysmal nature and definite course of the attack usually make its nature apparent. The headache of cerebral tumour or intracranial syphilis is almost always more general, and the patient rarely has such intervals of absolute

freedom. A commencing occipital lobe tumour may give rise to attacks of headache with hemianopia and scintillations, but the sudden onset and abrupt cessation of these attacks is unlike the course of migraine, and eventually a convulsive seizure or the onset of papilloedema may make the diagnosis clear. Similar symptoms may occur in certain cases of epilepsy, and here, as in cases of tumour, the occurrence of a fit may show that the ailment is not migraine. The onset of an ocular paralysis in a case of supposed migraine calls for the most careful revision of the diagnosis and a thorough examination of the nervous system, for ophthalmoplegic migraine is a rare condition and the causes of headaches with ophthalmoplegia are many: migrainous neuralgia is commonly mistaken for tic douloureux, but it is not brought on by washing the face, nor by eating or talking; moreover, the pain is less intense and has a less precise distribution; migrainous neuralgia is accompanied by nausea and occurs in subjects who have previously suffered from more typical migraine.

Treatment between the Attacks.

The more specific treatment involves: (1) the use of drugs acting on the vegetative nervous system, (2) general nervous sedatives, and (3) the correction of ocular refractive errors; general measures are also of great importance.

Of the drugs which act on the vegetative nervous system those most in vogue are nitroglycerine and thyroid; calcium lactate has also been credited with good results. Nitroglycerine is best given in the form of liquor trinitrini, of which doses of ½–1 minim are to be taken in acid solution three times a day; it may also be given in the chocolate tablets (each = gr. 1/100), half a tablet or a whole tablet being taken thrice daily. The administration of these doses is to be continued over long periods except during the actual migraine attacks when it should be stopped. Nitroglycerine was extensively used by Gowers, and is still the most widely efficacious remedy; some patients obtain complete relief from it alone. Thyroid, unless there is any indication of thyroid deficiency, is sufficiently exhibited in a dose of grs. 2 of the dry extract taken at bed-time; it probably acts as a general metabolic stimulant. Of the drugs regarded as general nervous sedatives luminal is undoubtedly the best; gr. 1–1½ at night or gr. 1 night and morning, is sufficient. It is best given in tablet because it has a low solubility, and because the soluble compound (with sodium) is not nearly so efficacious. With the less severe types of migraine great reduction in the frequency and severity of the attacks may be obtained from luminal and thyroid without recourse to liquor trinitrini. Bromides are in frequent use and are often combined with salicylates.

The degree to which ocular trouble can be held responsible for migraine is a matter of controversy, but there is no dispute that the sufferers are mostly educated people who read a considerable amount and in whom consequently any astigmatism, heterophoria, or muscle imbalance is likely to be the source of a particular fatigue. It is therefore essential that at the very outset of treatment such conditions should be carefully tested for and, as far as possible, compensated. Gross refractive errors play less part in practice, since among such patients they have nearly always received attention at an early age.

General Measures.

The frequency of attacks is so much affected by the patient's general health that no possible adverse influence can be neglected. The condition of the bowel is naturally the first care. Any tendency to constipation must be effectively treated, and even though constipation be not present benefit is derived from a morning saline. A minute dose of magnesium (or potassium) sulphate, not sufficient in quantity to produce any unpleasant action on the bowel, is perhaps the most efficacious, but one of the more palatable effervescent salines may often be substituted. Even a glass of water taken regularly in the morning is helpful. One of the mildly aperient spa waters may be drunk in quantity before meals throughout the day, and in severe cases a course of treatment at a spa is to be recommended. When an attack is thought to be imminent a prompt measure is indicated, such as an effective dose of calomel or a Seidlitz powder. Late hours, stuffy rooms, and fatigue are to be avoided, and sufficient exercise and fresh air must be obtained. The tonic effect of a holiday may procure an unwonted period of freedom; many patients find that unless they have a game of golf regularly at the week-end their headaches increase in frequency and severity, and probably in such cases the exhilaration of the game and its surroundings count at least as much as the exercise. In women anæmia and dysmenorrhœa require careful attention, for the migrainous subject rarely endures a painful menstrual period without an attack. Local infection in the tonsils or in the appendix should be thoroughly treated, and any obstructive trouble in the nose rectified.

The *diet* should be plain; very many patients regard factors in their food as a precipitating cause of their headaches and are aware of the particular circumstances that induce their attacks. It may be an excess of sugar, or an excess of protein, or purin-containing dishes or condiments or alcohol, or almost any single article of food; such causes vary widely from patient to patient, and consequently it is necessary to treat each case individually. In general, the experience of one patient in regard to diet meets with very restricted success when applied to the treatment of another. The limitation of diet is a measure to be applied in moderation, and only one kind of restriction should be enforced at a time; unless the patient's experience gives some other indication the abolition of sweetmeats should be the first to be tried. In considering the influence of such restrictions it must be remembered that the placing of a veto on any single article of diet has the effect of making the patient more careful in regard to his diet as a whole, and consequently benefit may ensue which is not a specific result of the prescribed limitation.

In short, in dealing with migraine, the rule is to review minutely with each patient his diet, conditions of work, and general mode of life, and to endeavour to discover and correct any circumstances by which headache is likely to be induced.

The Attack.

The attack of migraine, once established, is difficult to dispel. If there are prodromal symptoms which the patient recognises the attack may in some cases be aborted or greatly reduced in severity by a dose of calomel or a Seidlitz powder and full doses of aspirin, or one of its congeners, every 2–3 hours. In addition to official remedies there are many analgesics, mostly of the coal-tar group, on the market (e.g., veramon, arcanol, migranin, analgit). Most of them are of value and a patient may find a particular combination which suits him better than the others. These palliatives enable many patients to continue work during the attacks. One of the features of migraine is a peculiar irritability of the sensory systems and all who suffer from the more severe forms go to bed and endeavour to shut out light and noise and to have absolute rest. Some ask only to be left alone, and certainly the first rule is not to disturb the patient with much treatment. The analgesics mentioned may bring a little relief; some patients take strong coffee in addition, some like a compress on the forehead. Little can be done to hasten t e climax of the nausea, but when this is reached and vomiting is achieved, sleep usually follows without difficulty. Occasionally chloral or veronal may be required, and in rare cases morphia is used to induce sleep and to enable the patient to retain nourishment in a long-lasting attack.

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Special Articles.

CONCERNING THE PROBLEM OF MOUNT EVEREST.

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DURING the expeditions to Mount Everest in 1922 and 1924 it was proved that man can climb, although with difficulty, at an altitude of about 28,000 feet.[1] Norton, Somervell, Mallory, and Irvine reached this height. In addition it was proved that man can live, for some days at least, at altitudes above 23,000 feet (oxygen pressure = 9·5 per cent. atmosphere); several of the climbers spent three or four days above this level, whilst Odell spent ten days at 23,000 feet. Somervell, Norton, Mallory, and Irvine slept for one night at about 26,800 feet. Nevertheless, the exhaustion produced by climbing at 28,000 feet is described as fearful, and progress is very slow indeed. Mallory and Irvine lost their lives whilst climbing somewhere above 28,000 feet. It is possible that they were near the summit, 29,000 feet, where the oxygen pressure in the air is only about 7½ per cent. of an atmosphere. It has yet to be proved whether man can climb at this altitude. In recent experiments with animals[2 3 4] I have proved that some mammals —rabbits, rats, and mice—can live for at least seven days under continuous exposure to oxygen pressure at 7½ per cent. of an atmosphere. The animals were resting at normal temperature (15°–20° C.) and were not exposed to the rigors of chilling winds and very low temperatures, such as the climbers experienced. The outline of one of these experiments is given in Table I.

TABLE I.

Thirty animals in Messrs. Siebe Gorman's decompression chamber: 6 rabbits, 6 guinea-pigs (g.-pigs), 6 rats, 12 mice. T. = 15°–20° C.

Barometer mm. Hg.	Av. O_2 pressure in inspired air.		Approx. altitude corresponding to O_2 pressure.	Deaths.	Duration in days.
	mm. Hg.	Atmosphere.			
		Per cent.	Feet.		
600	116	16·6	7,000	—	3
440	85	12·1	15,000	2 mice.	7
400	77	11·0	18,000	—	1
375	72	10·3	20,000	6 mice.	6
320	62	8·8	25,000	1 mouse, 6 g.-pigs.	7
290	56	8·0	27,500	—	1
260	50	7·1	30,000	1 rabbit, 1 mouse.	8

Average loss of weight of survivors = 23·1 per cent.[2]

The animals—6 rabbits, 6 guinea-pigs, 6 rats, and 12 mice—were exposed in a decompression chamber to gradually decreasing oxygen pressure such as might be experienced during a gradual ascent of the mountain. The animals thus had about four weeks to become acclimatised to low oxygen pressure before they were exposed to the lowest pressure (7½ per cent.) equivalent to that at the summit. Of the 30 animals under investigation, only 13—5 rabbits, 6 rats, and 2 mice—survived the experiment and, although they were obviously deteriorating rapidly, they gradually regained normal vigour when again under normal oxygen pressure.

In another experiment 50 normal mice were exposed to low oxygen pressure for 53 days, and on 14 of these days the oxygen pressure was as low as that on the summit of Mount Everest. The barometric pressure was kept about normal in this case; the special closed chamber used has been described elsewhere.[2 3] This experiment was really part of the control for another research to detect the effects of low oxygen pressure on cancer growth in rats and mice; the results for cancer were given in another communication to THE LANCET (April 28th, 1928, p. 828). Of the 50 normal mice tested, 21 died (see Table II.) under the effects of the low oxygen pressure and the others were killed for histological examination.

TABLE II.

Fifty mice exposed to low oxygen pressure for 53 days at normal barometric pressure. T. = 15°–20° C.

Days since beginning of experiment.	Mice alive.	Deaths.	Killed for histological purposes.	Av. O_2 pressure in inspired air.		Average altitude corresponding to O_2 pressure.	Days at Mount Everest level.
				Atmosphere.	mm. Hg.		
				Per cent.		Feet.	
0	50	—	—}	11·6	81	16,000	0
7	50	—	—}				
14	50	—	—	9·8	68	20,000	0
21	50	—	—	9·3	65	22,000	1
28	40	10	—	8·2	57	26,750	3
35	40	—	9	8·3	58	26,500	3
42	29	2	—	8·0	56	27,500	3
49	22	7	2	8·7	61	25,000	1
53	20	2	18	7·2	50	30,000	3
Total ..		21	29	—	—	—	14

Average weight of survivors before experiment = 19·4 g.; after experiment = 15·9 g.; difference = −18·0 per cent.

Numerous other similar experiments were carried out on a monkey, 3 cats, 3 rabbits, 9 rats, and 2 guinea-pigs. Only the rabbits, mice, and rats were able to tolerate oxygen pressure as low as 7½ per cent. for any length of time; the monkey,[3] after a reasonable degree of acclimatisation, was collapsed, although it could be aroused with difficulty. Like the other animals which were unsuccessful, it showed evidence of heart failure, but recovered completely under normal oxygen pressure, regaining its lost weight and growing at the normal rate again.

A few details of pathological changes in some of these animals have been described[2 3 4]; confirmation of these earlier results and fuller information from about 100 animals are now available.

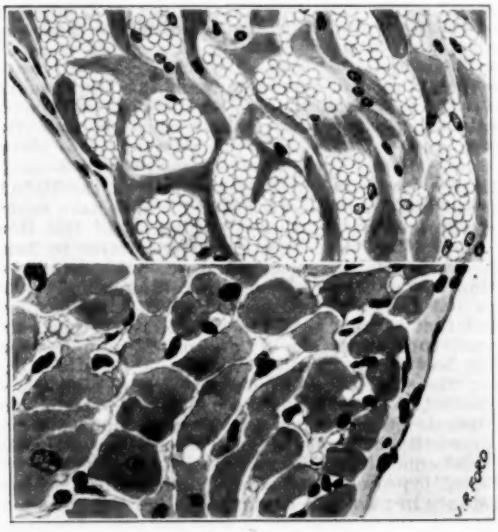
Pathological Effects of Prolonged Exposures to Very Low Oxygen Pressure (7½ per cent.).

All the animals which died under very low oxygen pressure revealed extreme congestion of the liver, of parts of the lungs, and of parts of the heart. Marked congestion was also often seen in the spleen, the kidney, the brain, and the suprarenal; but the liver, lungs, and heart were often markedly affected when the other organs showed only moderate changes. Portions of the lungs were sometimes emphysematous. An extreme degree of fatty degeneration was observed in the hearts and livers of rabbits and guinea-pigs,[4] but only a slight degree—if any—in rats and mice. Nevertheless, in all four types of animal the congestion in parts of the heart and in the liver was so great that there was marked atrophy and even necrosis of the cells. Occasionally œdema was observed in several organs. The congestion was due to failure of normal forward movement of blood, the capillaries appearing engorged with blood and excessively dilated. Perhaps the dilatation in the first place was to help the heart, or it may have meant failure of vasomotor nervous centres. Such failure might be expected under very low oxygen pressure, but if the heart were able to work efficiently under low oxygen pressure there is no reason why the centres should suffer from oxygen deficiency, since the circulation could be accelerated as in exercise. In some animals the engorgement of the organs was so great that an increase in the blood volume was suspected; in others the congestion was not sufficiently widely

distributed to suggest plethora as an embarrassment to the heart. Under low oxygen pressure the red cells increase in number and the viscosity of the blood is thus increased; to counteract this more fluid might be drawn into the circulation, the red cells then increase again, and so on until a plethora results from a vicious cycle. There is also the possibility of the marked dilatation of the capillaries being due in part to the production of histamine-like substances.

The heart muscle-fibres near the epicardium were widely separated from one another by the dilated capillaries and exhibited atrophic changes (see Fig. 1), whilst the liver cells appeared merely as the threads in a network (Fig. 2). The suprarenal sometimes showed atrophy of cortex and medulla, with disappearance of many cells from the latter. The kidney, although sometimes markedly congested, showed but moderate degrees of atrophy and degeneration. In the brain there was often congestion and occasionally disappearance of some of the nerve-cells. Ten of the animals which survived the experiment and were killed for histological purposes showed similar and equally marked changes, but a small majority showed a moderate degree of congestion, while two or three showed scarcely any change from normal; these two or three were apparently able to withstand the very low oxygen pressure. The simplest explanation is that their heart muscle was able to function under very low oxygen tension and to keep the circulation going well. In the animals which succumbed, the symptoms during life and the post-mortem evidence indicated the onset of heart failure as the main cause of inability to tolerate very low oxygen pressure. Undoubtedly all organs must

FIG. 1.

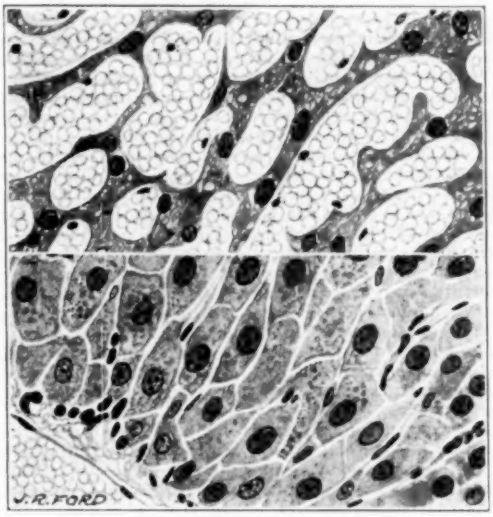


Monochrome drawings of heart muscle near the epicardium of a normal mouse (below), and of a mouse failing to tolerate low oxygen pressure. Note engorgement of capillaries, with effects upon muscle-fibres. Hæmatoxylin and eosin (× 450).

be affected by the abnormally low oxygen pressure, but the supply and pressure of oxygen in the other tissues depend upon the ability of the heart to keep the circulation going strongly. If the heart could do this there was marked power to withstand low oxygen pressure as demonstrated by a few of the animals; if it could not the animals fell by the wayside at an earlier stage with the same pathological changes. These pathological results with animals offer a suitable explanation why climbing at high altitudes leads to fearful exhaustion.

Judging from the number of deaths among these resting animals it seems doubtful whether human beings will be able to tolerate such a low oxygen pressure for a period long enough to reach the summit of Mount Everest, and it will be difficult to choose suitable climbers. It is suggested that subjects should be trained for some weeks by spending a few hours daily in decompression chambers and that they should then be tested for their ability to retain their mental and physical vigour in order to carry out the necessary muscular effort while breathing oxygen

FIG. 2.



Monochrome drawings of liver from a normal mouse (below) and from a mouse failing to tolerate low oxygen pressure; note engorgement of capillaries with atrophy of cells. Hæmatoxylin and eosin (× 450).

at about 7½ per cent. of an atmosphere. In this way those who were successful would have the advantage of knowing they could climb under low oxygen pressure such as they would experience on the summit of Mount Everest.

Major Hingston [5] states that all the climbers had dilated hearts; their excessive panting on exertion was probably due to the onset of heart failure. They all showed loss of weight and of appetite at high altitudes. Similarly my animals in the present and previous experiments [3] lost on an average 20 per cent. of their weight, and they were young growing animals. Major Hingston states that the climbers with poor appetite preferred sweet foods at very high altitudes, and I found that the addition of glucose (5 per cent.) to the drinking water increased the consumption of fluid. I found that the animals consumed much less water when exposed to low oxygen pressure. Of course, mountaineers experience thirst at great altitudes because of the relatively dry air and the large volume breathed; but my experiments prove that low oxygen pressure itself tends to diminish water consumption. Some of the mice were given alcohol (2 per cent.) in the glucose solution and others adrenalin chloride (1/100,000, Parke, Davis and Co.) freshly dissolved in glucose solution every few days; but none of these substances materially benefited the animals, judging by the average weights of different batches of ten mice.

Acclimatisation to Very Low Oxygen Pressures.

It is not always very clear what is meant by the word acclimatisation. According to Major Hingston,[5] Somervell believed that acclimatisation took place at 24,000 feet even though there was physical deterioration and dilatation of the heart; evidently in this case acclimatisation means absence of the subjective

symptoms of mountain sickness. Perhaps acclimatisation is usually taken to mean maintenance of normal appetite leading to normal metabolism and body-weight.

Dr. J. S. Haldane [6] recently gave it as his opinion that secretion of oxygen by the lung was necessary to explain the great efforts displayed by the 1924 expedition. He holds that in this way the oxygen tension in the tissues is kept near normal in acclimatisation. Prof. Joseph Barcroft [7] supports this view of tissue oxygen tension, but opposes the secretory theory and puts forward various other factors for acclimatisation. My own recent experiments [2 3 4] on tissue oxygen tension, where the oxygen tension in the tissues was actually measured for the first time, gave no support to the opinion that oxygen tension in the tissues is kept near normal; all my animals, including those which acclimatised well, showed a markedly subnormal tissue oxygen tension under very low oxygen pressures in the air. In my opinion acclimatisation means the ability of the tissues, particularly the heart, to tolerate a low oxygen tension and to function normally. Acclimatisation takes place far too rapidly in some cases to be explained by such slow changes as increase of hæmoglobin and of red cells, or alteration of oxygen dissociation curve. It is not argued that increased breathing, increase of hæmoglobin, &c., are not of value when they do occur; no doubt they are, but they are not capable of bringing the oxygen tension in the tissues to normal again whilst under very low oxygen pressures in the air. The main factor deciding the power to tolerate very low oxygen pressure is the heart muscle.

It is well known that short spells of very low oxygen pressure are tolerated by certain individuals—e.g., air pilots and other experimental subjects. Major Hingston records that birds flew up around the camp at high altitudes but did not remain there long. It is the prolonged periods of exposure which slowly work their harmful and more than temporary effects. The longer the climbers are exposed to very low oxygen pressures the smaller will be their chance of reaching the summit, however expert climbers they may be. Perhaps the daily inhalation of oxygen at normal pressure for a few hours—as suggested by Dr. Leonard Hill—when above 15,000 feet might inhibit, to some extent, these evil effects. The failure of oxygen in the previous expeditions was perhaps due to the fact that damage to the heart had already occurred and a short spell of breathing purer oxygen could not be of any great use. What the climbers required was complete rest under higher oxygen pressure for a longer period, and not further climbing efforts at a higher altitude hampered by an oxygen apparatus.

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CARLISLE INFIRMARY AND THE FEVER HOSPITAL.—The result of an inquiry by Mr. W. F. Fox, of the Charity Commission, into the question of transferring control of the Fever Hospital to the Carlisle City Corporation has now been announced. It may be recalled (see THE LANCET, June 16th, p. 1239) that the governing body of the Cumberland Infirmary, which is in urgent need of extension, was opposing the transference, as the infirmary would then lose its only feasible means of extension. The Charity Commission reports that the inquiry "failed to disclose any practical alternative to the scheme proposed in respect of the Fever Hospital, or to show that the scheme will place the Infirmary in any worse position than at the present." The Commissioners will therefore proceed to complete and establish the scheme, to the great regret of the infirmary governors.

BRITISH EMPIRE CANCER CAMPAIGN.

ANNUAL REPORT.

THE report of the year's work was presented by the Grand Council of the British Empire Cancer Campaign at the annual meeting held at the House of Lords on July 9th. A steady development of activities is recorded. The number of research workers subsidised had been substantially increased, larger grants have been made to institutions, and new centres have been started, notably in Manchester, Liverpool, and Chester.

The Council in an introductory review of the work in progress comment on the difficulty, familiar to all bodies who propose to subsidise research on a large scale, of finding a sufficient number of suitable workers. They express the hope that the International Conference on Cancer, which will meet under their auspices on July 17th in London, will assist in coördinating existing knowledge of cancer problems by enabling English and foreign workers to exchange views on a common footing. Summaries under appropriate headings of the results of research carried out during the year under the auspices of the campaign appear over the signature of Mr. J. P. Lockhart-Mummery, the honorary editor of the report. These general summaries serve to show how wide is the scope of the investigations being made, but they would be more useful if documented by references to the names of workers or of institutions, or to the pages in the report where results are recorded.

During the year efforts have been directed towards the production of immunity against cancer, and to the perfection of the technique of making records of the behaviour of malignant cells in tissue culture. Chemotherapy and radiotherapy have been tried experimentally and on the human subject. The virus theory put forward by Gye has been critically examined, and the study of carcinogenic substances has been pursued. We select for notice the attempts to produce immunity, the studies of therapeutic agents other than surgery, and work on the virus theory.

Attempts to Produce Immunity.

In the Cancer Research Department of the Middlesex Hospital Dr. S. L. Baker and others have inoculated fowls with emulsions or filtrates of the Rous sarcoma, which have been rendered inactive by heat, formalin, or ultra-violet radiation. No definite or lasting immunity has been thus obtained. Prof. S. Russ and his colleagues, working in the same hospital, found that normal rats can be effectively protected against tumour growth by means of tumour tissue which has been exposed to a suitable dose of radiation; the same tissue which can cause a high degree of protection when fresh can cause some stimulation of tumour growth when autolysed. The production of immunity in this way is a process very sensitive to local conditions and very easily disturbed. Four different types of tumour have been used to produce resistance in rats, two carcinomas and two sarcomas. Rats resistant to one type of sarcoma proved resistant to the other type, and mostly also to a hæmorrhagic quickly-growing carcinoma, but no cross immunity was established between the other carcinoma and the sarcomas. Dr. J. C. Mottram, of the Radium Institute, found that chickens in which skin tumours had been made to disappear by radiation were sometimes immune to subsequent inoculation. At the Lister Institute Dr. T. Lumsden has attempted to produce a tumour vaccine by injecting into a tumour a dilution of formalin just adequate to kill the cells while producing little alteration in their chemical constituents. He states that in the last series of 40 rats thus treated 38 were cured of implanted tumours, and of these 36 were afterwards found to be immune. He suggests that concentrated antiserum may be even more effective than formalin, but it is more difficult to obtain. This form of treatment has not yet been tried on spontaneous tumours except in one case.

A rat with a spontaneous mammary tumour was treated with three inoculations of 2 c.cm. concentrated antiserum from a human subject with breast cancer; the tumour disappeared for four months, but then recurred. Dr. Lumsden hopes to be able to make further trial of this treatment on spontaneously occurring tumours. At the University of Edinburgh Mr. J. J. M. Shaw has attempted to determine whether autogenous epithelial implants will protect mice from the production of tumours by applications of tar. The experiments suggest a slight measure of protection, but are not conclusive. Mr. F. C. Pybus and Mr. H. R. Whitehead, working at Newcastle, failed to demonstrate a serum specific against malignant cells growing in vitro. Mr. Harold Burrows is examining the mode of action of various cytolytic agents in connexion with immunisation.

Tissue Culture.

Besides those who have used the method of tissue culture in their researches on the production of immunity many others are now employing this technique. At the Middlesex Hospital factors influencing the rate of growth of embryo, adult, and malignant tissues are under test, and permanent records are being made by the cinematographic process. At St. Bartholomew's Hospital Dr. Malcolm Donaldson and Dr. R. G. Canti have been studying the action of irradiation respectively on normal and malignant cells in tissue cultures with the cinematographic apparatus designed by the latter. They hope by this means to elucidate the laws governing the disappearance of malignant growth under the action of radium. Mr. E. Neville Wilmer at Manchester has, with Mr. L. P. Kendal, investigated the properties of the growth-activating principles in Witte's peptone. Contrary to the results obtained by Carrel they found that the pure proteose fraction was inactive in saline media.

Therapeutic Methods.

At the Cancer Hospital (Fulham-road) the blood-picture during the clinical application of X rays has been studied. The conclusion is reached that dosage should be controlled by blood-counts, since overdosage is dangerous. Patients vary in their resistance to radiation, and repeated doses at short intervals appear to exercise little influence on the blood until the "saturation point" is reached, when a sharp diminution of the white cells occurs. The change in the blood is likely to progress when once initiated until a minimum value is arrived at, after which, if no further treatment is given, the blood-picture returns to normal; but if the initial dose has been too large the patient may not recover. The effect of a dose administered at the crucial stage when saturation point has been reached is not easy to calculate, and this is a defect in a mode of treatment which nevertheless is said to be used successfully in an increasing number of patients. The combination of radiations of various wave-lengths is said to be giving encouraging results in the treatment of superficial cancers.

Lead treatment of cancer has been tried at various institutions. Workers at the Middlesex Hospital, after strictly controlled animal experiments, arrived at the conclusion that even when this treatment was begun within five days of the inoculation of a tumour no appreciable effect could be observed on its progress. The result of blood analyses on human patients treated by this method showed a consistent rise in the non-protein-nitrogenous content; in cases examined after death the blood-urea had risen to abnormally high levels. From St. Bartholomew's Hospital the report on this treatment is even more unfavourable. No evidence was obtained that the use of lead by intravenous injection leads to the resorption of neoplastic tissues in man; the average duration of life after treatment was less than the expectation of life without such treatment; and the histological appearances of the growth before and after treatment were indistinguishable. A series of cases treated by lead followed by deep X ray therapy gave more encouraging results, but it is not clear to which of the agents the improvement, when it occurred, was due. In Birmingham a team consisting of Dr. A. P. Thomson and Dr. G. Bulmer, Dr. F. W. Mason Lamb and Mr. G. Sanders, M.Sc., have treated 34 patients with colloidal lead. It is not stated whether these were inoperable when first seen. Two cases were markedly improved, three slightly improved, and five remained stationary; three deaths might be attributed to the treatment. The conclusion reached was that the method is of distinct therapeutic value, and a suggestion is made that the most profitable results will be obtained in cases where palliative incomplete operations have been performed. Dr. F. D. M. Hocking, working at Westminster Hospital, reports favourable changes in cases of carcinoma (not in sarcoma) following injections of thorium and uranium.

Radium.—Among the accounts of treatment is a report from the Westminster Hospital stating that "the treatment of oral cancer by radium has practically displaced surgical treatment." The Cancer Research Committee of the London Association of the Medical Women's Federation have had good results with radium in uterine cancer, especially in cancer of the cervix. St. Bartholomew's Hospital Radiological Cancer Research Department consider that it is too early to draw conclusions from the condition of the cases treated, but they pronounce that in breast cases the results of radium have been "very promising indeed," and that the results in cancer of the upper air passages and uterus show a marked improvement on those reported in previous years. A hopeful sign is that no patient reported "free from signs of disease" in previous reports has yet developed a recurrence. In Birmingham, of 26 cases of inoperable cancer of the rectum treated by radium five are definitely improved, two being completely well at present; the time that has elapsed since the treatment was given is not here recorded.

The Virus Theory.

At the Cancer Hospital Research Institute, under the direction of Prof. A. Leitch, the Rous tumour has been transmitted to fresh fowls by the inoculation into the pectoral muscle of the minced pancreas, free from metastases, from a tumour-bearing bird. Control inoculations with a composite mince of liver, spleen, kidneys, and muscle from infected birds did not yield positive results. In other experiments, following Gye's technique, an extract from the Rous sarcoma was treated with chloroform sufficient to destroy the "virus"; a quantity of this extract was then injected into the pectoral muscles of one side of a fowl and about half of the quantity injected into a corresponding region of the other side, together with a portion of minced pancreatic extract from a normal fowl. Tumours were produced only from the side where pancreas was injected. Since, according to Gye's theory, the chloroformed extract contained only the accessory chemical factor, the cancer virus would have had to be supplied by the normal pancreas. This experiment, therefore, provided evidence against Gye's theory and led to the further study of the active principle. Some support was obtained for the view that the active agent of the Rous sarcoma may be enzymatic in nature. The difficulties of interpretation are increased by the fact that no means exist for separating viruses from enzymes. Workers from the Middlesex Hospital consider that the evidence that the Rous sarcoma is due to a filtrable virus seems good. No definite evidence has been obtained that mammalian tumours contain a virus, though Gye's experiment in which chloroformed Rous tumour filtrate is activated by a "culture" of a mammalian tumour has been repeated. The activating effect of fluid containing pieces of mammalian tumour may be due either to the addition of a ferment, or of some non-specific substances, to an attenuated Rous virus, rather than to the addition of a fresh virus of mammalian origin. In Edinburgh Mr.

C. F. W. Illingworth is carrying out a critical repetition of certain of Dr. Gye's researches.

Financial Position.

Owing to the gift of £10,000 from an anonymous donor the income of the campaign this year has exceeded the expenditure. Attention is drawn to heavy commitments for the future, notably the publication of the *Cancer Review*, which is now a permanent feature of the campaign's work, and has to be provided for over a period of five years at a total estimated cost of £15,000. The cost of the journal for the present year amounted to £2538, administrative expenses to £2676, cost of appeals to £2673; grants to hospital and research workers accounted for £18,158.

The public are reminded in the report that no claim to have discovered anything important bearing on the cure or prevention of cancer is left uninvestigated, and that no proper appeal for assistance is refused without careful consideration.

MATERNITY AND INFANT WELFARE.

NATIONAL CONFERENCE AT GUILDHALL, LONDON JULY 4TH–6TH.

A CONFERENCE promoted by the National Association for the Prevention of Infant Mortality, in coöperation with the M. and C.W. Group of the Society of M.O.H.'s, was held from July 4th to 6th in the Guildhall, London, under the auspices of the Central Council for Infant and Child Welfare. There was a large attendance of delegates including representatives from the Dominions and other countries. The first day of the meeting was devoted to visits to child welfare institutions. The actual conference was carried through in four sessions on the second and third days.

Relative Values.

Sir ARTHUR STANLEY presided over the opening session on the relative value of intensive methods employed for the reduction of infant mortality. Sir GEORGE NEWMAN, the President of the Conference, in an introductory address, showed how much the movement for the welfare of mothers and children had depended on the pioneer efforts of voluntary workers.

Sir TRUBY KING (New Zealand) gave an interesting comparison between Holland and New Zealand. In Amsterdam the infant mortality was about 50, the mortality in the first month was 13, and for the remaining 11 months of the year 37, while the maternal mortality from childbirth was about 2 per 1000 births. In New Zealand the infant mortality was about 42, the mortality in the first month being 28 and in the remaining 11 months 14, and the maternal mortality was 5. New Zealand had concentrated on the child while Holland had concentrated on the mother, and achieved its good maternal and neonatal rates by well-trained midwives and a good obstetrical service. In New Zealand they were now devoting their attention to the obstetrical service, and they hoped that, as a result, before long their total infant mortality-rate would be under 30.

Dr. ERIC PRITCHARD (London) referred to the great variation in the neonatal mortality-rates in the various districts in this country as indicating that a large proportion of these deaths were preventable. He referred especially to the competition, promoted by the *Daily News* under the ægis of the National Baby Week Council, among the districts, which could show the largest percentage reduction in the neonatal rate of 1927 when compared with the average rate for the years 1922–26. Of the districts with populations of 100,000 and upwards Leyton won the first prize with a neonatal rate of 18 in 1927 and a percentage reduction of 10; and Bethnal Green won the second prize with a rate of 20 and a percentage reduction of 7. The two highest neonatal rates in this group were South Shields C.B. with a neonatal mortality-rate of 42 and Oldham C.B. with a neonatal mortality-rate of 48·6. Of the districts with populations between 100,000 and 50,000, Finchley U.D. won the first prize with a neonatal mortality of 12·7 for 1927 and a percentage reduction of nearly 15, and Bath C.B. won the second prize with a neonatal mortality of 21—a percentage reduction of 12. The highest neonatal rates in this group during 1927 were Barnsley with 36 and Wigan with 39. In answer to a questionaire most of the competitors hesitated to attribute the decrease of neonatal mortality to any one particular factor, but suggested a combination of causal factors, such as improved child welfare administration, increased efficiency of health visitors, improved housing, and a better midwifery service. Dr. Pritchard concluded by expressing his strong belief that much more could be done by applying the knowledge we had obtained from the feeding of animals to securing a satisfactory diet for expectant and nursing mothers.

Dr. S. G. MOORE (Huddersfield) described the scheme which had been in operation for some years in a special district of Huddersfield and which was now to be applied to the whole borough. The essentials of the scheme are the visitation of expectant mothers and the babies, after they are born, by whole-time women doctors, and an endeavour to secure continuous nursing, day and night, when necessary, for sick babies in their own homes. In 1912–14 the infant mortality-rate in the special district was 111 and in the rest of the borough 101. In 1921–23 the rate in the special district was 72 and in the rest of the borough 80. In 1921–26 the rate in the special district was 69 and in the rest of the borough 79. Among the 4721 women whose pregnancy was notified and supervised during the years 1917 to 1924 the maternal mortality from childbirth was 1·87 per 1000 births, as compared with a maternal mortality of 5·67 for the mothers whose pregnancy was not notified and supervised.

Dr. A. HAMILTON WOOD said they had 36 centres in Warwickshire, all under voluntary management, but they needed double the number. He advocated motor transport for the health visitors, the conduct of antenatal clinics by doctors who were not in practice, and more maternity hospitals, and thought it was a great pity that the Ministry, for financial reasons, had been obliged to cut down the supply of free milk for expectant and nursing mothers.

Dr. T. Y. FINLAY (Edinburgh) thought that so far antenatal work in Edinburgh had reduced maternal mortality more than neonatal mortality.

Maternal Morbidity.

At the second session was discussed what Lady BARRETT, who presided, described as the "failures of midwifery."

Prof. BECKWITH WHITEHOUSE (Birmingham) referred to the low maternal mortality-rate of 1·3 per 1000 births attained by the Queen's nurses in their attendance on 55,960 maternity cases during 1927. Certain extern departments of maternity hospitals also had a rate of less than 2. He thought these results were obtained by efficient organisation, antenatal supervision, absence of hasty interference during labour, and surgical cleanliness. He summarised his recommendations as follows: (1) the trained nurse-midwife should attend all normal obstetric cases; (2) antenatal supervision and the decision as to when a case was normal or abnormal was the duty of the medical profession; (3) antenatal centres should be available in all areas, at which the general practitioners should attend to see their own patients and also those submitted by the midwives in the area; (4) the antenatal centres should provide sterilised obstetric outfits, to be paid for by the patients or out of the maternity benefit; (5) panels of obstetric specialists should be available for the help of the practitioner, not only for puerperal pyrexia, but for all complications; (6) in-patient maternity departments should be established in all hospitals for the investigation of difficult antenatal problems and the management of grave obstetrical complications. He thought that

normal cases should be attended in the homes and that hospital beds should be chiefly reserved for primiparæ and complicated or "borderland" cases.

Dr. F. T. H. WOOD (M.O.H., Bootle) thought it would be difficult to work an antenatal clinic conducted by general practitioners in towns, and Dr. Whitehouse in reply urged the extreme importance of interesting the general practitioner in antenatal work and suggested that Dr. Wood's objection might be met by the holding of more frequent clinics.

Dr. HELEN MACMURCHY (Canada) said that 641 replies made by the 8000 practitioners of Canada to a Ministry questionaire indicated that many practitioners had solved this question for themselves. One practitioner had had no maternal death in 37 years and many had had no deaths among a series of 1000 cases.

Mr. K. M. GRANT (Salford) urged that doctors should work only with trained midwives at confinement cases.

Prof. LOUISE MCILROY (London) spoke on the great importance of postnatal clinics to ensure that everything possible was done to repair damage left by the confinement. She described a "Discharge card" issued by the Royal Free Hospital to every woman who left the lying-in wards. The card gives particulars of the character of the labour, the condition of the mother and infant on leaving, &c., and is intended to be taken by the patient to any clinic (or doctor) which she may attend subsequently. Most so-called diseases of women were due to confinements. Lacerations were inevitable, but their repair was most important. She believed that cancer of the cervix, which took a larger toll of women's lives than childbirth, could be to some extent prevented by careful postnatal supervision. The antenatal doctor leaves the confinement to the midwife, but the midwife should send the patient back to the doctor for overhaul after the confinement. If each mother was supplied with a card or obstetrical "dossier" recording all her pregnancies and confinements it would save an enormous amount of speculation on the part of medical attendants.

Prof. PIRQUET (Vienna), who was invited to speak, referred to the work done by the League of Nations Committee in the investigation of the causes which led to the very different mortality-rates in the various countries. He said that Norway led Europe with an infant mortality of about 30 and that Oslo led also in birth control, but that they had gone too far in this latter respect, the birth-rate being less than a quarter of what it used to be. He could sympathise with birth control after the sixth or seventh child, but not as regards the first. He regarded the tendency to avoid having children as a mere fashion, which would pass away. The birth-rate in France was now going up a little. The resident population of the U.S.A. had few children, but there was some evidence of a change of viewpoint, and the desire for the first child was being put before the desire for a car. One of the important points in which the public needed education was the protection of the lying-in mother and her baby from catarrhal infections brought in by neighbours.

Dr. ESTHER RICKARDS said they had the advantage in Tottenham of a unification of the public medical services. The midwives were being induced to send back the mothers to the clinic for postnatal overhaul. One-third of the women examined at the antenatal clinic came back to her about four weeks after confinement and 50 per cent. needed some treatment. Health visitors can also persuade the mothers to come to the clinic. Coöperation with the midwife was most important. Infant cards, school cards, antenatal cards, and confinement dossiers should be passed on, completing the cycle.

Maternal Mortality.

Dr. EARDLEY HOLLAND (London) opened the discussion on the causes and prevention of maternal mortality at the third session, presided over by Dr. ELWIN H. T. NASH. The safening of child-bearing should, he said, be the outstanding problem of public health. In spite of the able reports on the subject issued first by the Local Government Board and more recently by the Ministry, they had not yet captured public opinion. Other countries beat us—for example, Holland, Denmark, Sweden, Norway, and Italy—all with rates under 3 per 1000. Some countries were worse than we were—Switzerland, Germany, and the U.S.A. Sepsis accounted for about 40 per cent. of the deaths and 70 per cent. of the septic cases were complicated labours. He had recently had the opportunity of investigating conditions in Sweden. The Swedish maternal mortality had remained at about 2·5 per 1000 births during the last 25 years, in spite of efforts to reduce it still further. Contracted pelvis was rare in Sweden and toxæmias were less frequent than here. In Sweden the medical curriculum lasted nine years and the medical students had four months' residential training in midwifery in large hospitals manned by experts, in which there were no midwives trained, the medical students doing all the midwifery work. The midwives went through two years' training also in large maternity hospitals in which there were no medical students. The antenatal work in Sweden was done by obstetrical experts. All Swedish mothers were attended by midwives and the doctor was only summoned for complications or to give anæsthetics. The maternity hospitals were splendid and 30 per cent. of the women were confined in them last year. The number of practising midwives was becoming less as more mothers went into hospitals for confinement. Midwives in Sweden have been trained since 1680, their training is founded on a very good education, and the service has great traditions. Both the midwifery and medical professions enjoy much greater prestige in Sweden than in this country. This confidence in the midwives and doctors abolishes the fear towards child-bearing which is so prevalent here and which is inculcated in our prayer-book and certainly affects the proper performance of the function of child-bearing. He thought, if we gradually reorganised our obstetric service on the lines adopted in Sweden, we might ultimately halve our maternal mortality and save 1500 lives of mothers annually in addition to preserving the health of very many more. Up to now our efforts had been utterly futile.

Dr. R. VEITCH CLARK (M.O.H., Manchester) said that maternal mortality involved maternal morbidity and neonatal mortality, besides being a lamentable destroyer of home and family life. Fifty per cent. of gynæcology was concerned in repairing the damage done by child-bearing. In spite of the fact that Manchester lost half the sunlight available in the neighbourhood, nowadays they only saw rickety deformities in adults, and we could look forward hopefully to the disappearance of pelvic deformity as a cause of death in child-bearing in another generation. The remedies for high maternal mortality —viz., antenatal supervision and a better midwifery service—were rendered difficult to obtain by the fact that the expectant mother does not know she needs them. Nurses, health visitors, and midwives are those who can best educate the mothers. The midwife should be guaranteed her fee if she loses her patient by sending her to the antenatal clinic, and the remuneration of midwives should be raised, if necessary, by subsidies. Investigation in Manchester had shown that privacy for the confinement was impossible in the majority of homes and maternity hospital beds were therefore needed for normal cases. The antenatal centres should be grouped round the larger hospitals. Much further research is required as to the physiology of pregnancy.

Mr. ALECK BOURNE (London) was convinced, as a teacher and examiner of midwives, that insufficient stress was laid on the general principles lying behind the practical details. Quite ineffectual solutions of lysol might take the place of cleanly methods. Rubber gloves, judging by the careless way they were used, were regarded as possessing magical properties. The talk about antenatal work was throwing into the background the importance of recognising abnormalities early in labour. One examination of the urine

at the seventh month was of little or no use. The urine should be tested every fortnight during the last two months of pregnancy, however fit and healthy the patient appeared to be. The occurrence of hæmorrhage, however slight, during pregnancy, was not always regarded seriously enough. The midwife should be paid better and her status advanced.

At the fourth session Dr. JANE TURNBULL (Ministry of Health) described possible administrative arrangements for the unmarried mother and her child.

MEDICINE AND THE LAW.

Medical Confidence (Attempted Suicide).

AT an inquest at Eastbourne, held at the end of last month, upon the body of a man who met his death on Beachy Head, Dr. R. R. Pirrie stated that two years ago he was called in to see the deceased, who had been found unconscious in a gas-filled bathroom. Asked by the coroner if it was not usual in such cases to report the occurrence to the police, Dr. Pirrie replied in the negative. "From the legal point of view," pursued the coroner, "you may be guilty of being an accessory in not notifying a case of attempted suicide?" "Yes," replied the witness, "but I look at it only from the medical point of view; I am prepared to risk being charged as an accessory; in this case the man recovered and I warned the family." In bringing in a verdict of "suicide while of unsound mind," the jury added as a rider that they thought it would have been as well if the doctor had reported the previous incident. Unperturbed by this declaration, which he described as "purely a pious resolution and not part of the verdict," Dr. Pirrie rejoined that a practitioner has a duty to his patients and that it is not his duty to report such a case to the police.

There can be no doubt that the medical profession will approve their colleague's action and statement of principle in this matter. The patient required treatment, not prosecution. The jury, perhaps, held the mistaken view that medical privilege is claimed and maintained in order to save doctors the trouble of taking part in police proceedings. Medical privilege exists in the interests of the patient. The patients, or their families, require the best medical advice and treatment at the moment, and frank disclosure of all the facts may be necessary in order that the medical assistance may be invoked to the best advantage. There will necessarily be some hesitation on the part of the family in these cases if it is possible (or indeed probable) that the doctor may regard it as his duty to set the police in motion and to furnish them with information not intended to be so applied. There may be occasions when a doctor may have the duty of disclosing his knowledge of a crime, or at any rate of putting such moral pressure upon the criminal as he may deem proper with a view to prevention or confession. One case differs from another and a general statement of professional propriety is difficult; but the duty to the patient comes first. In the Eastbourne case Dr. Pirrie's warning to the relatives was of more practical value than a notice to the police. Action by the police might well have aggravated the patient's condition.

Consideration for Medical Witnesses.

By the courtesy of the courts it has been customary to give special consideration to medical practitioners when called as witnesses. It has been realised that the nature of their duties makes it desirable not to keep them in attendance in courts of law longer than necessary, and it has been found possible sometimes to interpose their evidence out of its turn and usually to release them at the earliest moment. It need not be assumed that this convenient course is to be interrupted merely because of some observations of Mr. Justice Horridge at Hereford Assizes last month. Asked by counsel if a country doctor, who had given his evidence, might be allowed to leave the court, the judge is reported to have replied that doctors were very useful people, but they seemed to think that the administration of justice was entirely subservient to their convenience. "There may be one or two questions I want to ask: he must wait." The court, we are told, then adjourned for lunch. No witness, whether medical or otherwise, would regard it as unreasonable that he should remain in attendance until the court had heard the whole of his evidence. Medical witnesses, however, are justified in asking leave to return to their professional duties as soon as their evidence has been fully given unless, of course, the case is one in which they have undertaken to be present throughout and to advise upon the evidence given by others. A proper application to the judge, deferentially submitted, will usually receive a courteous answer. The remarks of Mr. Justice Horridge may either be dismissed as not very seriously meant, or else discounted as mere obiter dicta.

Criticisms of Coroners Acts.

Fresh criticism has recently been directed at the amendment in the law of coroners made in 1926, whereby inquests can be dispensed with. Such cases fall into two classes. First, there are the deaths where the coroner, after his own private inquiries and without any post-mortem examination, has satisfied himself that no inquest is necessary; he then informs the doctor in attendance on the deceased that he sees no objection to the cause of death being certified as suggested. Secondly, there are the "no inquest" cases, within Section 21 of the 1926 Act, where the coroner (1) believes that a post-mortem examination may prove an inquest to be unnecessary, (2) asks a doctor to make a post-mortem examination and report under the new statutory power, and (3) being thereby satisfied that an inquest is unnecessary, sends the registrar "a certificate under his hand stating the cause of death as disclosed by the report." The report in the latter case is not, of course, given upon oath, and those who are critical of the Scottish system of inquiry (shorn of the publicity which the inquest ensures in England) have not hesitated to comment on the change. Dr. F. J. Waldo, in his evidence before the Home Office Committee on Coroners, once laid down the principle that, if a post-mortem examination be necessary, a public inquest with the witnesses on oath, and in the presence of the relatives, was equally necessary. Parliament, however, in 1926 gave the coroners a discretion in the matter, carefully guarded (subs. (3) of Section 21) by the saving clause that the new provision should not be construed as authorising a coroner to dispense with an inquest in any case where there was reasonable cause to suspect that the deceased had died either a violent or unnatural death, or had died in prison or in certain other special circumstances. If the country has thus—through Parliament—shown this sign of confidence in coroners and the medical profession, those who are so trusted need not repudiate their responsibility. If that confidence is found to have been too lightly given, public opinion would doubtless insist on a change in the law. Meanwhile, there is all the greater obligation upon members of the medical profession to be scrupulously careful and exact in matters of death certification. Solicitors, of whom a high standard is expected in proceedings where large sums of money may be at stake, are fortified in the discharge of their duties by the knowledge that they are, by statute, "officers of the Supreme Court." The medical profession has an even greater responsibility.

THE DUCHESS OF YORK AT HOSPITALS.—On Tuesday in last week the Duchess of York opened a new fresh-air ward and an operating theatre at the St. Nicholas Hospital for Crippled Children at Pyrford, Surrey. Also last week the Duke and Duchess opened an extension of the Queen Alexandra Memorial Hospital at Weston-super-Mare which, with its equipment, has cost £50,000.

UNITED STATES OF AMERICA.

(BY AN OCCASIONAL CORRESPONDENT.)

The Minneapolis Meeting: Presidential Address.

THE seventy-ninth annual session of the American Medical Association, held last month at Minneapolis, Minnesota, was made notable by the presidential address by Dr. W. S. Thayer, of Baltimore, an address showing great breadth of vision and couched in beautiful language. Dr. Thayer reminded his audience that they represented a profession organised for no selfish end, but, as their constitution has it, " . . . to promote the science and art of medicine and the betterment of public health." Since it is the unusual which constitutes news, the self-seeking commercialised doctor is the one who is shown most often in the newspapers. Too many of us generalise carelessly from what we read in the papers. " I am not likely to forget," he said, " the response given by a large assembly of physicians in London when the Lord Chief Justice, in a graceful address, spoke of the fundamental likeness between the profession of law and that of medicine, each humane and devoted to the alleviation of the ills of mankind. The audience laughed. I was mortified and pained." Nevertheless, continued Dr. Thayer, to be a physician to-day is a privilege. Few greater opportunities are given for immediate service to our fellows, and for that intimate association with men and women which cultivates human charity and sympathy and understanding and tolerance, one of the most beautiful of words, and temperance, one of the most abused. To make the most of his opportunities a doctor must have a basic education—one that should enable him to appreciate that which is fine in life, in art, and in literature.

Standard of Medical Education.

Through the efforts of the American Medical Association, with its council on education, and the generous assistance of the foundations, the standards of education in the profession have been materially raised until to-day the opportunities for medical education in America, fundamental and post-graduate, are second to none.

" Recently," Dr. Thayer remarked, " we have met with rather severe criticism in the delightful, although somewhat acrid, address of Sir Andrew Macphail,[1] who bitterly complains that the raising of our standards of admission to schools of medicine is flooding some of the institutions of a sister country with undesirable men. To which one can only reply that we are truly very sorry. We should be only too happy to deliver him from the plague of locusts from which we have been delivered ourselves. We did not mean to turn the cloud in his direction. But would he ask us to take them back ? "

The Full-time Plan.

There has been considerable criticism of the so-called full-time plan in this country which did not fail to find some expression at this session of the House of Delegates. Dr. Thayer, however, deprived the critics of most of their thunder by pointing to three main misconceptions on which criticism has been based. It has been said that in some schools a professor is debarred from private consultation. Dr. Thayer knows of no school of which this is true. The understanding that exists in some schools that fees for private consultation shall be turned into the budget of the professor's department has been denounced as the practice of medicine by an institution. This aspect of the plan, Dr. Thayer points out, is in any case a detail, and in no sense a vital principle. Third, and most important, is the misconception that it is the ultimate ideal of the university school of medicine to place clinical teaching in the sole hands of university professors.

[1] Macphail, Andrew: American Methods in Medical Education, Brit. Med. Jour., 1927, ii., 373.

Early Specialisation.

Turning to the content of the four years' course in medicine, Dr. Thayer suggested that the attempt has been made to crowd too much subject matter into these years. The medical school is not the place for the training of specialists, nor can one emerge from a school of medicine a skilled surgeon. The specialist who has not had a good basic medical training is a danger to society. Too early specialisation is one of the great faults of modern American education. The speaker suggested that those responsible for the curriculum of the nurses' fundamental course are perhaps making the same kind of mistake. The tendency of modern practice is more and more towards specialisation and organisation, and away from the obviously desirable intimate contact between physician and patient. This is in line with the trend of society in other fields, but it raises problems of great importance to the profession. In seeking solutions there are certain fundamental truths to be remembered: " We have," said Dr. Thayer, " duties as physicians towards our patients, to treat them when ill, to advise them lest they become ill, and to the public lest the sickness of our patients becomes a menace to the public health. We have duties also as members of the public who are specially informed and so specially responsible to see that our public health officials are men of high character and adequate training."

The attendance at this session of the meeting was almost 5000, and the scientific exhibit easily the largest and most successful on record. The presidential address and most of the scientific papers read at the session will be fully reported in the journal of the Association.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Housing Conditions in Edinburgh.

THE chief sanitary inspector for Edinburgh, in his annual report for the year 1927, remarks on the progressive policy of the local authority in connexion with slum clearance and housing improvement. Much still remains to be done in improving the housing conditions in many parts of the city. A recent survey showed that there were no less than 5035 houses that could be classified as unfit for habitation. These are mainly situated in the central and more congested parts of the city, but there are also large groups in the more suburban areas. Of the total number, 2243 are one-apartment houses, 2327 contain two apartments, 370 three apartments, and the remainder four or more apartments. Many of these houses have been listed for inclusion in future improvement schemes. If the progress made during the past few years is maintained the whole of these houses could be swept away in a comparatively short period. It has been found that to obtain the best results constant supervision of the occupiers of the new houses is essential. Accordingly, in addition to the routine inspection, arrangements are being made for the systematic visitation of the houses by an experienced inspectress who is to devote special attention to backward tenants. These visits have already achieved good results in improving the habits of the people.

In connexion with this report, it is interesting to note that the Board of Management of the Edinburgh Welfare Housing Scheme have recently issued a special appeal for financial assistance in connexion with the housing scheme which they intend to inaugurate in Edinburgh. They aim at a sum of £25,000 to £30,000, to be raised partly by voluntary gifts and partly on debenture loan. If such a sum were raised, or even, to start with, a smaller amount of £7000–£8000, an experimental block of suitable houses could be provided, which would be let at about 8*s.* 6*d.* a week, inclusive of rates. The houses,

when built, would be related to the child welfare activities, municipal and voluntary, of the city, just as many other child welfare activities are already related: the tenants would be selected in view of the need of benefit to young children in the families of the less well-paid wage-earner.

The Effect of Milk on School-children.

The delegates to the World's Dairy Congress held a conference in Edinburgh on July 5th. In the absence of Sir Leslie Mackenzie, Dr. Gerald Leighton, of the Scottish Board of Health, submitted a paper on Milk Consumption and the Growth of School-children, based on experimental findings (see THE LANCET, 1928, i., 202). In November, 1926, the Scottish Board of Health set up a committee to test the effect on 1400 school-children in Peterhead, Aberdeen, Dundee, Edinburgh, Glasgow, Paisley, and Greenock, of a daily ration of milk in addition to their ordinary diet. The experiment has been carefully devised to test the nutrition value of milk, separated milk, and a control food of equal caloric value; the ages of the children tested were from 5 to 13 years. All the children lived at home under the ordinary conditions of Scottish working-class families. The investigation is still in progress, but from the data already available the following conclusions could be drawn:—

(1) The addition of milk to the diet of children of school age during the period under review has been accompanied by an increased rate of growth as indicated by an increase in both height and weight of 20 per cent. greater than that in children not receiving the extra milk.

(2) This increase in the rate of growth has been accompanied by an improvement in the general condition of many of the children receiving milk.

(3) Separated milk is of great value for promoting growth. Its nutritive value for children of school age would appear to be underestimated.

The reports indicated that the children receiving milk appeared to be in better general condition than those who did not receive it. On the whole they had glossier hair, clearer complexions, and even held themselves more erect. The most marked improvement was shown in those children who had been in poor condition at the beginning of the investigation.

Award of the Neiller Prize.

On July 2nd, at a meeting of the Royal Society of Edinburgh, Principal Sir Alfred Ewing, the President, presented the Neiller prize for the period 1925–27 to Prof. Arthur Robinson, professor of anatomy in the University of Edinburgh. The President recalled the fact that, early in his career as an anatomist, Prof. Robinson turned his attention to problems of mammalian embryology, and his first work on the subject was published in 1888. Since that time a series of important papers had appeared from his pen dealing, for the most part, with the development of individual organs in man and other mammals. Of special importance and value were those papers dealing with the early stages of development of mammalian ova. Two of the important conclusions, formulated on the evidence relating to ovarian follicles in the ferret, were afterwards verified in other mammals by the experiments of Prof. Edgar Allen, of the University of Missouri, and by other investigators. During the study of the follicles, Robinson's attention was drawn to the occurrence of prenatal death; with the aid of his own material, supplemented by data provided by the Board of Agriculture for Scotland, he was able to prove that prenatal death occurred with great frequency from causes other than external agencies. The Neiller prize was awarded to him for his recent work in comparative mammalian embryology, and in recognition of his published work extending over a period of 40 years.

Academic News.

The Court of the University of Edinburgh have approved a scheme of rearrangement of the curriculum of medical students in their third year by which the courses now given in two terms will be spread over three. This applies to the systematic courses in medicine and surgery, and to the theoretical and practical courses in pathology, bacteriology, materia medica, and therapeutics. The class examinations will be rearranged accordingly. No increase, either of the total number of meetings of the classes or of the amount of fees payable by the students, is involved.

In consequence of the rearrangement of the curriculum for the Diploma in Tropical Medicine and Hygiene, the diploma is now recognised as a qualification for the posts of junior public health officer in the Colonial Medical Service.

At the recent graduation ceremony at the University of St. Andrews, the Principal referred to the scheme for providing residential entrance scholarships. When the system was fully operative, he said, a steady succession of selected students, unharassed by financial anxiety, would have the opportunity of a Scottish University education, supplemented by the benefits of collegiate residence. The list of these scholarships had recently been increased by an additional award. The firm of Messrs. Tullis, Russell and Co., to which Dr. David Russell belonged, had agreed to contribute £100 annually towards the maintenance of a scholar at St. Andrews, preference to be given to students coming from central Fifeshire.

Public Health Services.

ANOTHER CASE OF ALLEGED OVER-PRESCRIBING BY A PANEL PRACTITIONER.

THE East Sussex Insurance Committee at its meeting on July 3rd had before it a report from its Medical Service Subcommittee dealing with the investigation of prescribing by insurance practitioners and the effect on the medical service of the action of the Regional Medical Officer of the Ministry of Health in criticising the prescribing of a doctor in East Sussex. The facts were similar to those stated in a previous case, some particulars of which were given in THE LANCET of April 14th last (p. 776). It appears that as the result of objection taken by the R.M.O. on general grounds to the cost of a certain proprietary preparation of colloidal iron combined with malt extract, the doctor in question had ceased to order it for his insured patients. The question was raised by a patient who was accepted by the doctor after the period with which the R.M.O. was dealing, so that the latter could not have had before him details of the particular case.

Reviewing the facts, the subcommittee states its opinion that this case confirms the impression derived from the previous case—namely, that the action of the R.M.O. has had the effect of unduly restricting the discretion of medical practitioners in prescribing medicines for their patients, and has tended to create an impression that the insurance medical service is inferior to that rendered to private patients. The procedure laid down by the Regulations in regard to the investigation of prescribing, the rights thereunder both of practitioners and insured persons, and the duties of practitioners, were fully set out in the previous report, and it appears that the statements made and conclusions drawn in that report have not been challenged. The subcommittee therefore recommends the Insurance Committee to inform the practitioner that, in the opinion of the Committee, he should not cease to prescribe for his insurance patients drugs which he believes to be reasonably necessary for their adequate treatment, unless and until the Panel Committee, or the appropriate tribunal on appeal, has decided that the supply of these drugs imposes a cost upon insurance funds which is in excess of what is reasonably necessary for such adequate treatment.

It was decided to raise the question of the principles involved at the meeting of the National Association of Insurance Committees to be held in London next October.

SCHOOL MEDICAL SERVICE.

Name of district.	No. on roll.	Average elementary school attendance.	No. of routine children examined.	No. of special examinations and re-inspections.	Percentage of children found on routine examination requiring treatment.†
Bedfordshire	—*	—*	4,262	1,872	18·65
Cumberland	—*	—*	7,862	12,590	20·0
Torquay .	3,751	3,280	1,389	5,546	21·0

* Not given. † Excluding dental defects and uncleanliness.

Bedfordshire.

THE value of medical inspection is greatly lessened if no treatment clinics exist where parents can obtain advice and minor ailments receive medical attention. Home visits by the nurses are a valuable adjunct to such clinics but can never satisfactorily replace them. It is therefore disappointing to note under Table IV., "Return of defects treated during the year," that no minor ailment has been treated in Bedfordshire under the council's scheme; this presumably means that no minor ailment clinics exist in this county. The school medical staff consists of Dr. R. T. Herdman, S.M.O., and deputy M.O.H., one school dentist, Mr. F. S. Cooper, and one school nurse.

Dr. Herdman remarks that the health of the children seems to be less good this year than it was last year; he attributes the deterioration partly to an epidemic of influenza in the beginning of 1927 and to the sunless summer and autumn. It is clear, however, that his department is understaffed and that the county lacks the facilities on which some of its neighbours rely for the promotion and maintenance of good health in school-children. Dr. Herdman, working single-handed, cannot do impossibilities, and his dental colleague, Mr. Cooper, obviously finds it increasingly difficult to keep pace with his work. It is curious to find treatment facilities so inadequate. There are apparently no special schools of any kind, and no mention is made of open-air schools or orthopædic schemes. This is surprising and inconsistent, for in other directions great efforts seem to be made on modern lines. For example, the senior scholars who are transported from smaller villages to larger centres there receive a good hot mid-day meal, which is cooked, served, and cleared away by the children; moreover, efforts are made to supply dry stockings and slippers for children who have walked long distances to school.

Cumberland.

Dr. F. H. Morison, M.O.H. and S.M.O., explains that the county is divided into six areas, each in the charge of a medical officer responsible for the whole of the work in the area. He stresses the importance of coördination; in Cumberland record cards of the welfare centres are passed on to the schools and show that the percentage of defects in the entrants would be considerably reduced if it were possible to examine and treat all the infants before they came to school. The proportion of entrants requiring treatment this year is three times as high as last year. These children were for the most part born in 1922, which year had a relatively high infantile mortality-rate in the county and a correspondingly high sickness-rate in the next four years of life.

Dr. Morison discusses in a broad-minded way the problem of tonsils and adenoids, citing a case where the prosecution of the parents by the N.S.P.C.C. for refusing treatment aroused hostile comment. He states that he has always laid down the principle that the mere presence of enlarged tonsils and adenoids is not necessarily an indication for operation, but that in certain cases, particularly those with ear symptoms, it is essential to secure their removal. In the particular instance where action was taken, it was the opinion of three members of the school medical staff and of the family doctor that the operation was urgently needed. Hospital accommodation being inadequate, some cases of surgical tuberculosis have been nursed in frames in their own homes, the children being visited once a week by the orthopædic after-care sister and once in four months by one or other of the visiting staff from Windermere. Advantages claimed for this system are (1) considerable saving in expense (a case of spinal caries in hospital may cost as much as £250); (2) the children can start treatment at once without waiting for a hospital vacancy; and (3) hospital beds are left free for the admission of non-tuberculous cripples, who can be dealt with in a much shorter time. It is admitted that the procedure is often impracticable—in rural areas where close supervision is impossible, where parents are not able to coöperate properly or to provide extra food, and where home conditions do not allow open-air treatment. To us it seems that the system may be of some value as a temporary device but not as a satisfactory substitute for more hospital accommodation, which seems to be urgently needed.

Further reports are given on the benefits of iodine in goitre. Dr. Kenneth Fraser has been elected a Fellow of the Royal Society of Edinburgh for his valuable work in this connexion. This year for the first time calcium is also being administered in the hope of improving the results of treatment.

Torquay.

The M.O.H., Dr. T. Dunlop, introduces the report by Dr. J. V. A. Simpson, assistant S.M.O.

The arrangements for the coördination of the work of the school medical service with that of the health department are satisfactory; and the same medical officer who carries out the routine school work attends the maternity and child welfare centres and thus supervises the health of the children from birth right up to school-leaving age. All the facilities for treatment are available for the pre-school child, including the dental service. The good results of Mr. T. G. Fenton's operations for removal of tonsils and adenoids at the Torbay Hospital are recorded. All cases are seen after operation by the medical officer and instructions are given as to the after-care of the child. Dr. Simpson, who is responsible for this report, would prefer an arrangement whereby hospital after-care could be provided for at least 24 hours; and possibly this may be secured when the new hospital is erected. Cripple children for some years past have been sent to special hospitals in London, Bristol, Alton, and elsewhere. No child failed to receive treatment except when parents refused it (two cases). During the past year a comprehensive orthopædic scheme for the county of Devon has been inaugurated and the Torquay authority is coöperating in this. The school clinic is used as the local orthopædic centre once a week and Mr. Brennan Dyball visits it once a month. The year at the open-air school has been highly successful; during the summer a complete set of baths, including shower baths, was installed. The climate of Torquay is so mild that the children can be out in the open air on more occasions than in most other towns in the kingdom; rheumatic children are apparently receiving much benefit from this school.

Dr. Simpson is using the kata-thermometer for estimating the adequacy of ventilation in existing schools and in those being reconstructed. He is also continuing his research into standards of physical fitness of schoolboys and is opening a new line of investigation on the measurement of the ultra-violet rays of the atmosphere under the guidance of Dr. Leonard Hill.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 30TH, 1928.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 219 (last week, 230); scarlet fever, 1639; diphtheria, 963; enteric fever, 37; pneumonia, 757; puerperal fever, 39; puerperal pyrexia, 103; cerebro-spinal

fever, 9; acute poliomyelitis, 4; encephalitis lethargica, 20; dysentery, 7; ophthalmia neonatorum, 111. No case of cholera, plague, or typhus fever was notified during the week.

The cases of small-pox were notified from the following 20 counties: London, 12; Bedford, 2; Derby, 23; Durham, 49; Lancaster, 10; Middlesex, 1; Norfolk, 1; Northampton, 1; Northumberland, 19; Nottingham, 8; Salop, 1; Stafford, 9; Surrey, 2; Sussex West, 1; Warwick, 3; Yorks, North Riding, 5; West Riding, 38; Brecknock, 1; Glamorgan, 18; Monmouth, 15.

The number of patients in the Infectious Hospitals of the Metropolitan Asylums Board on July 3rd–4th was as follows:—Small-pox, 58 under treatment, 2 under observation; scarlet fever, 1760; diphtheria, 1909; enteric fever, 16; measles, 520; whooping-cough, 159; puerperal fever, 16 (plus 14 babies); encephalitis lethargica, 68; poliomyelitis, 1; "other diseases," 29. At St. Margaret's Hospital there were 18 babies (plus 15 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 31 (7) from measles, 5 (0) from scarlet fever, 24 (1) from whooping-cough, 29 (4) from diphtheria, 45 (10) from diarrhœa and enteritis under two years, and 31 (4) from influenza. The figures in parentheses are those for London itself.

The fatal cases of enteric fever outside London occurred at Newport (Mon.), and Cardiff. Of the 24 fatal cases of measles outside London, 5 were reported from Liverpool, 4 from Newcastle-on-Tyne, and 3 each from Birmingham and Middlesbrough. Of the 23 fatal cases of whooping-cough outside London 6 were reported from Birmingham and 3 from Liverpool. During the same week Glasgow reported 6 deaths from whooping-cough.

The number of stillbirths registered during the week was 333 in the great towns (corresponding to a rate of 50 per 1000 births), including 61 in London.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. A. R. Schofield to be Surg. Capt.

Surg. Lt. H. M. Devane to be Surg. Lt.-Comdr.

The following appointments are notified:—Surg. Comdrs.: E. B. Kenny to *President* for R.N. Recruiting Headquarters; G. D. Walsh to *Pembroke* for R.M. Infirmary, Chatham; A. G. Valpy French to *Pembroke* for R.N. Hospl., Chatham; and J. G. Boal to *Berwick*. Surg. Lts.: W. V. Beach to *Wallace*; A. L. McDonnell to *Vivid* for R.N. Hospl., Plymouth; M. Clifford to *Renown*; and J. M. Sloane to *Pembroke* for R.N. Hospl., Great Yarmouth. Surg. Lt.-Comdr. (D.): D. Paterson to *Egmont* for R.N. Hospl., Malta. Surg. Lt. (D.): D. Barker to *Victory* for R.M. Infirmary, Portsmouth, and to *Victory* for R.N. Barracks, Portsmouth.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt.-Comdr. W. C. Macartney to be Surg. Comdr.

ROYAL ARMY MEDICAL CORPS.

Maj. D. W. Bruce retires, receiving a gratuity.

W. A. Lethem (late Maj., R.A.M.C., Mila.) to be Maj.

Capt. D. P. H. Gardiner to be Maj.

Capt. A. U. Webster relinquishes his commn.

TERRITORIAL ARMY RESERVE.

Capt. J. C. Knox, from the Active List, to be Capt.

ROYAL AIR FORCE.

Squadron Leader R. H. Knowles to be Wing Comdr.

Flight Lt. C. A. E. I. Brownlee to be hon. Squadron Leader.

Flying Officer L. Freeman is promoted to the rank of Flight Lt.

Flight Lt. E. E. Isaac relinquishes his temporary commn. on completion of service and is permitted to retain his rank.

COLONIAL MEDICAL SERVICES.

Capt. R. Nixon, M.O., and Mr. H. H. B. Follit, M.O., Nyasaland, to be Sen. San. Offs. in the Tanganyika Territory.

Mr. H. P. S. Gillette is appointed M.O., St. Lucia, Windward Islands.

Correspondence.

"Audi alteram partem."

DIRECT REPRESENTATION ON THE GENERAL MEDICAL COUNCIL.

To the Editor of THE LANCET.

SIR,—As the university professorial and consulting element is so fully in evidence on the General Medical Council, it is fitting that the Direct Representatives of the profession should be general practitioners. With this I am absolutely in accord. At a meeting of the profession in my division (Kensington) it was resolved to put forward my name as a candidate for nomination at the coming election. I am, and have been, for the whole of my professional career a general practitioner pure and simple. I served for five years on the General Medical Council as a Direct Representative, and therefore am thoroughly conversant with its methods and procedure, so that if I were re-elected I could at once take my place in its deliberations without having to serve any apprenticeship. In the British Medical Association I have held every possible office, except that of Treasurer and Chairman of Council, having been chairman of my division, president of my branch, member of the General Council for 17 years, chairman of the Representative Body 1915–18, chairman of the Medico-Political Committee for seven years, president of a section at the general meeting in 1920, member, chairman, and vice-chairman of numerous special and "ad hoc" committees, and have also represented the Association on many outside bodies, in some cases for many years. During the whole of this time, both within the British Medical Association, and also very largely as a member of outside councils, I have done my utmost to further the honour and best interests of my profession. For these reasons I have allowed my name to go forward as a candidate, and I appeal to all members of the profession for their support. Should I be re-elected I should do my very best to carry out the duties of the post as I did when I was a member some years ago, when I never missed a single session or sitting of the Council.

I am, Sir, yours faithfully,

London, July 7th, 1928. E. B. TURNER.

To the Editor of THE LANCET.

SIR,—Owing to the lamented death of Dr. J. A. Macdonald of Taunton, and to the resignation of Sir Robert Bolam (who has been appointed representative for the University of Durham), there will be, in October, an election of two Direct Representatives on the General Medical Council by the medical practitioners of England and Wales. It is understood that meetings of the profession will shortly be called in all parts of the country to consider nominations for such representatives.

The educational side of the Council's work is well cared for by the representatives of the various universities and licensing bodies. Many of these representatives, too, are thoroughly conversant with the special problems of consultant practice, being themselves actively working in that sphere.

Only two general practitioners at the moment have seats on the General Medical Council. The penal cases, which absorb so large a proportion of the Council's time, deal often with situations arising in the lives of general practitioners, as is only natural seeing that general practitioners constitute the bulk of the profession. The preparation of the medical student for ordinary family practice demands emphasis in the regulations laid down for his education, and for this the advice of general practitioners ought to be useful.

We are advised of a strong feeling that opportunity should be taken of this by-election to place upon the General Medical Council two Direct Representatives who have the closest possible touch with the problems

and difficulties of the general medical practitioner. Having been approached on the matter, we venture to solicit the support of the profession as two general practitioners representing industrial and rural areas respectively. We are both in the active pursuit of our profession, and have had a good deal of experience of administrative and medico-political work, which we hope would be of value if the profession should see fit to endorse our candidature. One of us (J. W. Bone) has had 32 years in general practice, private and contract, in the industrial area of Luton, has served on the Insurance Acts Committee for five years, and at the present time has the honour to be a member of the Council of the British Medical Association and chairman of its Medico-Political Committee. The other (E. K. Le Fleming) is familiar with other aspects of private and contract practice through 27 years' work in the rural area of Wimborne; whilst in addition to serving on the Council of the British Medical Association and the Insurance Acts Committee he has been honoured by the confidence of the insurance practitioners for the past five years as chairman of the Conference of Local Medical and Panel Committees of the United Kingdom.

Our experience in interpreting the collective views of our fellow practitioners and our willingness to devote whatever time and energy may be necessary to the proper fulfilment of the duties of a Direct Representative embolden us to solicit the support of the profession generally.

We are, Sirs, yours faithfully,

JOHN W. BONE.
E. K. LE FLEMING.

July 7th, 1928.

NASO-PHARYNGEAL INFECTIONS AND EPIDEMIC JAUNDICE.

To the Editor of THE LANCET.

SIR,—In your issue of June 30th you publish a report of a discussion on naso-pharyngeal epidemics in public schools and an interesting leading article on epidemic jaundice in Great Britain. I have already in communications to the medical journals expressed my views as to the ætiology of the common cold, pointing out that the bacteriological aspect of these conditions does not cover the whole question; in fact, that bacteria may not be the primary agent at all, but that there is an underlying biochemical aspect which may be more essential. Organisms which were formerly harmless saprophytes may become pathogenic and infective, as a result of the disturbed biochemistry of the intestine, liver, and blood stream. Routine examination of the urine of people in ill-health has shown me the frequent occurrence, about and prior to a catarrhal season, of cases showing evidence of disturbed intestinal hepatic function, as indicated by the presence of indican, bile oxalates, and other bodies in the urine. The finding of similar evidence in many patients with catarrhal colds (probably these might be regarded as carriers) led me to think that the metabolic disturbance was the underlying cause of the activation of the organisms in the nose and throat. It is difficult to be dogmatic on this point, since one is not called to see these patients until the catarrhal attack develops; but I have had suggestive cases. One in particular who came to me in the height of summer because he was out of sorts. Examination did not reveal much wrong objectively, except that the urine contained bile. Treatment directed to this condition—ammonium chloride with alkalies—resulted on the third or fourth day after in his developing an acute fulminating catarrhal cold.

Recent American writers have been leaning to this metabolic aspect of the common cold and have claimed that it is due to a mild acidosis; and that they could precipitate an attack by the administration of calcium chloride or ammonium chloride. One cannot subscribe to this view entirely, since many patients take these drugs without evincing any signs of a cold; but their exhibition, when there is an underlying hepatic disturbance, may precipitate an attack.

There is probably some disturbance of the blood calcium as well in patients who get colds. Dr. J. A. Glover evidently had this metabolic aspect of the question in view when he recommended the inclusion in the diet of oranges, vegetables, salads, and watercress. The border-line between these cases of colds with disturbed hepatic function and those of epidemic catarrhal jaundice seems to me slight. I do not refer to those cases of jaundice definitely due to the *Leptospira icterohæmorrhagiæ*. I agree with Buchanan and Ross, quoted in your leading article, when they propose a bacteriological examination of the naso-pharynx and intestine in cases of epidemic jaundice. I would go further and suggest that not only bacteriological but biochemical investigation is required. In epidemics of catarrhal colds, or influenza, I have often wondered to what extent the jaundice associated with some of those cases was primarily due to the catarrhal organisms, or to a previous hepatic disturbance caused by some bowel organism—e.g., *B. coli*, which has become pathogenic. It is not easy to explain the fact that organisms in the nose and throat seem only sometimes to become pathogenic. My reading of it is that the soil has been prepared for them by metabolic and biochemical disturbances through atmospheric conditions, improper diet, overcrowding, insufficient fresh air and exercise, so that it is easy for activated organisms to find suitable soil when propagated by droplet infection. This droplet infection does not explain the numerous cases of colds which seem to spring up perhaps on the same day, at the very start of a catarrhal season, often in scattered parts of the town and country, and in people who have not been exposed to infection, but suggests auto-activation. The special frequency of post-operative pneumonia in cases of gall-bladder disease, gastric and duodenal ulcers, where the toxæmia factor is always more or less in evidence, is an allied problem which demands investigation.

I am, Sir, yours faithfully,

R. CHALMERS, M.D., F.R.C.S.E.

Darlington, June 30th, 1928.

"MANSON HOUSE."

To the Editor of THE LANCET.

SIR,—In the report in your issue of June 30th on the twenty-first anniversary dinner of this society Dr. Andrew Balfour is quoted as saying that "over £3000 had been raised towards the provision of a manson house for the Society." The verbatim report before me reads, "I should like to speak of the Manson Fund to provide what is going to be called possibly 'Manson House.' I say possibly because there is a distinguished member of our Council who has so little faith in the sobriety of his fellow Fellows that he feels that 'Manson House' might be mistaken for the building near the Bank or some celestial habitation, and he has proposed that it should be called 'Patrick Manson House' to prevent any such difficulty. I hope it will be called 'Patrick Manson House.'" Comment is not required.

I am, Sir, yours faithfully,

CLAYTON LANE,
Joint. Hon. Secretary, Royal Society of Tropical Medicine and Hygiene.

11, Chandos-street, Cavendish-square, London, W., July 4th, 1928.

LIVER TREATMENT IN PERNICIOUS ANÆMIA.

To the Editor of THE LANCET.

SIR,—Dr. J. H. Anderson in your issue of March 31st (p. 674) wishes to know if Orientals have long been using powdered liver for pernicious anæmia. It may interest him to learn that desiccated flesh of a carnivorous crow has for ages been used by the Indian *vaid* (herbalist) for a condition allied to

pernicious anæmia. Unfortunately, the nomenclature of diseases in the Unani system of medicine is rather defective, so that it is possible all the cases of anæmia thus treated may not have been of pernicious variety. Nevertheless, the fact that desiccated flesh including liver of a carnivorous crow has been highly recommended in the Unani system of medicine for anæmia makes it amply clear that the salutary effects of this treatment were well known to Orientals. To make further sure about this I referred to the book of therapeutics in the possession of a local Baluch *vaid* and found that there was in it first a description with signs of identification of this crow which is termed "Zagchah." Then the author proceeded to describe in detail its therapeutic qualities and recommended its desiccated flesh for regeneration of pure blood (*khalis khun*) in the system.

I may also state that I have seen *vaids* using similar things, but the Western science which has put therapeutics on a sound basis of reason does not permit even in thought the use of such drugs in that crude form. I am tempted to mention the following case by way of amplification. One patient had an attack of renal colic and the *vaid*, who was called in, had a goat slaughtered of which he removed the kidneys and made the patient swallow the same immediately, while they were still dribbling with blood. The patient not only obtained prompt relief but has not had an attack thereafter during the last eight years.

I am, Sir, yours faithfully,

P. V. KARAMCHANDANI, M.B., I.M.S.,
In charge Indian Military Hospital, Pishin,
June 11th, 1928. Baluchistan (India).

PERICARDIAL KNOCK.

To the Editor of THE LANCET.

SIR,—The communications on this subject from Dr. W. A. Lister and Dr. H. E. Symes-Thompson recall to my mind a case apparently unconnected with intrathoracic disease or injury. Some eight months ago a panel patient employed as manservant in London came to the south coast to convalesce from "neurasthenia." At the first consultation he gave a history of "shell-shock," and while recounting his then troubles he burst out crying. Five days later he called to apologise for having "made a fool of himself." He entered the consulting room in a very agitated state and said, "Do you hear my heart knocking, sir?" I was sitting at a distance of about five feet and the knock was distinctly audible for fully 20 seconds, and then stopped quite suddenly when the patient seemed more composed. Neither at that time nor at any later date have I found any physical abnormality. Two months later his mental condition having improved the patient found employment as a postman.

I wish now that I had used the stethoscope while the sound was audible, but at the time I was more amused than scientific. In this case, whose only abnormality was extreme nervousness accentuated by a desire to apologise for supposed lack of manliness, why should the left pulmonary artery be obstructed?—the cause suggested by Dr. Lister.

I am, Sir, yours faithfully,

Bexhill-on-Sea, July 9th, 1928. JOHN KERR.

To the Editor of THE LANCET.

SIR,—Dr. Symes-Thompson suggests that the peculiarly loud heart sounds in his case of empyema arose in the pulmonary artery, and are due to either tension or distortion of that artery. He also compares them to the sounds produced when estimating the blood pressure auscultatively. May I point out that there is no evidence whatever (1) that the artery was under increased tension or distorted; (2) that an artery distorted or under increased tension can produce a sound. He admits that as soon as the fluid was liberated from the chest the heart sounds disappeared; such an admission seems to prove that the fluid had a good deal to do with the production of the sounds. Such a fluid is easily moved by the moving heart, and moving fluid is particularly prone, especially when confined, to give rise to a sound.

My theory regarding the heart sounds is that they are due to the movements of the pericardial fluid which take place normally under a negative pressure of 6 to 8 cm. of water. If Dr. Symes-Thompson will half fill a rubber foot-warmer and shake it slowly from end to end he will hear noises resembling those due to his empyemic fluid. The comparison to the sounds heard when estimating blood pressure assumes that these sounds are produced by the vibrations in that artery, but a reference to my letter on the subject in your issue of May 12th last may tend to show that such an assumption is incorrect.

I am, Sir, yours faithfully,

Swansea, July 10th, 1928. G. ARBOUR STEPHENS.

BRITISH EMPIRE CANCER CAMPAIGN.

To the Editor of THE LANCET.

SIR,—I see that I am still stated to be Chairman of the Management Committee of the *Cancer Review* in the July number just published, and in the annual report of the British Empire Cancer Campaign. This is no longer the case as I resigned more than a month ago from this and the other Committees of the British Empire Cancer Campaign on which I had been serving. I shall therefore be obliged if any communications meant for me be addressed to 8, Queen-square, W.C.1.

I am, Sir, yours faithfully,

J. A. MURRAY,
Director, Imperial Cancer Research Fund.
London, July 6th, 1928.

AN OBNOXIOUS PRACTICE.

To the Editor of THE LANCET.

SIR,—It is right, I think, that attention should be called publicly to an obnoxious practice which is being rapidly extended in certain parts of London. I speak from facts within my own knowledge and with a complete sense of responsibility. I enclose my card for your information, but I do not sign my name, for some reasons that may be obvious, and for at least one that may not be obvious—namely, that I have no desire to appear more righteous than any of my neighbours. Still, I shall have no hesitation in giving my name if called upon, inasmuch as at present I feel intensely insulted at having been made repeatedly a party to a vulgar and dishonest trick. The insult is to my intelligence. I feel that I have been chosen as a dupe rather than as an accomplice. This is the sort of thing that happens. A physician is summoned in consultation, usually by telephone, on behalf of a practitioner whom he may or may not know. The message is to the effect that a fee of (say) £5 5*s.* will be paid to the physician. Or he is told that only £5 5*s.* can be paid, and he is asked to accept this. The consultation takes place, after which the practitioner leaves the room saying that he will see about the fee. He returns with the relatives for the usual interview and subsequently, perhaps outside the house, hands the consultant £5 5*s.*; but £2 2*s.* has been kept for himself, while the relatives believed that the consultant's fee was £7 7*s.* Sometimes the practitioner produces his own cheque at the consultation, for the agreed £5 5*s.*, receiving the £7 7*s.* from the family. There are several variants of the trick, all equally dishonourable, but not all equally clever, and two sources of weakness are obvious. One is that the relatives may insist on paying the consultant the full £7 7*s.*; the other is that the same consultant may be called in twice, the second time at the patient's own request, and with an honourable and straightforward practitioner in attendance. Discussion about the fee may lead to a reference to the previous fee, when the deception may be exposed. This has happened in my

own experience. I have written from the standpoint of my own experience, but have reason to believe that surgeons are victimized at least as frequently as are physicians! Obviously the practice is one that can hardly be suppressed by individual action. An analogous situation occurs sometimes, when the employers, the friends or the relatives of a panel patient ask the panel doctor to meet a specialist in consultation. The panel doctor does not desire to absent himself from the consultant's visit, but may spend time without hope of fee. He sometimes asks the consultant—who is paid by the employers—to "do something for" him in the matter. I have, in such a case, suggested that a fee should be paid directly in a complimentary way by the employers. But I was once asked by the panel doctor to add £2 2*s.* to my "account" for his sake!

I may perhaps say, in conclusion, that in my view the General Medical Council might well make a pronouncement to the effect that payments should always be made directly to the consultant and not through any intermediary, or that the amount of the fee should be stated by the consultant to the person responsible for the fee. It seems to me, however, that panel practitioners have a real grievance in not receiving the proper fee for being present at a consultation desired by the employers. This does not excuse an underhand method of obtaining a fee, though the existence of this real grievance has thus become apparent to me.

Let us hope that the publicity given to my experiences, which I know are shared by certain of my colleagues, will put an end to such practices.

I am, Sir, yours faithfully.

June 23rd, 1928. NEMO.

*** This letter reveals the existence of what is rightly styled an obnoxious practice. It is one that should receive immediate attention. Whether the General Medical Council would consider it any part of its duties or responsibilities to issue such a pronouncement as is sought, even in the form of a warning note, seems doubtful. The disciplinary powers of the Council would have to be set in action against those who disobeyed the pronouncement, or the Council would be stultified, and those powers can only be exercised if unimpeachable evidence were forthcoming. Publicity anyhow must act as a deterrent, opening the eyes of the public to a trick by which both they and a section of the medical profession may be victimised, although we hope that Nemo's experience is not a common one. If it is a fact that no provision can be made for the payment of panel doctors attending a consultation, the position should be altered.—ED. L.

"THE GREAT PROBLEM AND THE EVIDENCE FOR ITS SOLUTION."

To the Editor of THE LANCET.

SIR,—I was sorry to see in the honoured columns of THE LANCET a review which treated with contempt the recent book of Dr. Lindsay Johnson, "The Great Problem," in which he discusses spiritualism. Lindsay Johnson is a very highly qualified man and his views are shared by the vast majority of those who have actually investigated the subject. The opinion of those who have not is worth less. A century ago the medical profession stultified itself by its ridicule of mesmerism which it now uses as a powerful ally. It is sad to see it placing itself in the same false position towards spiritualism, for history will most certainly repeat itself.

As to the quality of the advertisements in psychic papers I agree with the reviewer that they might be improved, but is it reasonable to judge a vast subject not by the writings of a Lodge, a Crookes, a Wallace, a Richet, or a Flammarion, but by the advertisements in a few small papers?

I am, Sir, yours faithfully,

ARTHUR CONAN DOYLE, M.D. Edin.

Buckingham Palace Mansions, S.W.,
July 9th, 1928.

"IN AN INTERVIEW."

To the Editor of THE LANCET.

SIR,—Extracts from a paper by me on tuberculosis have been published by a newspaper and I should explain that no information of any sort was given by me, and that the extracts are based upon an advance copy of the *British Journal of Tuberculosis* obtained from the publishers. The account of the boxer was, I understand, obtained by the paper in the usual routine of news collecting; it certainly did not emanate from me. My real object in writing is to draw attention to the fact that another newspaper stated that I said "in an interview" that the treatment was still on its trial, or words to that effect. The "interview" actually consisted of asking me over the 'phone for an interview, and my reply that I could not possibly grant it, and that everything I had to say I had said in the *British Journal of Tuberculosis*.

I am, Sir, yours faithfully,

Manchester, July 10th, 1928. C. E. JENKINS.

THE TALE OF MEDICAL RESEARCH.

AN annotation published in our issue of June 30th under this heading has brought a communication from Mr. S. C. Turner, the Chairman of the Antivivisection (Battersea General) Hospital, protesting that statements made at the annual meeting of the Research Defence Society were misleading. Mr. Turner refers chiefly to the public announcement of Mr. Peart who, he says, remained surgeon to the hospital for four years after the situation was clear, while he had ceased to be honorary surgeon for two years when he made his announcement. Our words contained nothing to the contrary, and it is difficult to say why Mr. Peart should not be allowed to choose his own date for publicity, or to see in what way his period of silence has damaged the hospital.

UNIVERSITY OF ST. ANDREWS.—The Macewen prize in surgery has been awarded to Mr. Thomas Lawson McEwan, who is a graduate in medicine and in science of the University.

HOSPITALS AND THE MIDDLE CLASSES.—It is understood that the Pay Bed Committee of King Edward's Hospital Fund for London, appointed last year, will shortly issue its report on hospital accommodation for the professional and middle classes. The committee suffered a serious loss in the death of its chairman, Lord Hambleden, who, owing to his last illness, was unable to attend the deliberative meetings, though he had presided at the meetings when evidence was taken. The committee has devoted special attention to the question of voluntary insurance schemes.

BRITISH HUMANE ASSOCIATION'S LONDON CLINIC.—The officers of this clinic in Ranelagh-road, S.W., entertained several hundred medical visitors at a demonstration of therapeutic methods on the evening of July 10th. The institution was opened early this year by the British Humane Association; it succeeded the clinic in Tufton-street, and is one of the largest physiotherapeutic establishments in the world, its capacity being over a thousand patients a day. The ground floor houses offices and the saline and aromatic inhalation rooms, where patients with bronchial and pulmonary affections may breathe medicated air. On the first floor are the electrical and diathermy wards and a large tungsten-arc room. Almost the whole of the second floor is occupied by the mercury-vapour ward, and the whole clinic is elaborately equipped. The visitors saw the apparatus at work, and at a meeting over which Sir Bruce Bruce-Porter presided they listened to papers by Dr. Howard Humphris, who spoke on heliotherapy in general, by Dr. R. Deck, who gave an account of some unusual cases in tungsten-arc practice, and by Dr. Courtenay Mason, who explained the technique of inhalation treatment. The situation of the clinic is excellent, for it has a large poor population at its doors, and is accessible to south as well as to north London. Patients pay what they can afford, and it is stated that half of them make no payment. The clinic is maintained, as it was founded and equipped, at the expense of Mr. Campbell Johnston.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

REORGANISATION OF OFFICES (SCOTLAND) BILL.

ON Monday, July 9th, the Reorganisation of Offices (Scotland) Bill was considered in the House of Commons on Report and read the third time by 175 votes to 78. This is a measure which provides that the powers and duties of the Scottish Board of Health, the Board of Agriculture for Scotland, and the Prison Commissioners for Scotland shall cease to exist from the appointed day, and that their powers and duties shall be transferred to a Department of Health for Scotland, a Department of Agriculture for Scotland, and a Prisons Department for Scotland.

HOUSE OF LORDS.

MONDAY JULY 9TH.

Child Destruction Bill.

The Child Destruction Bill (formerly the Infanticide Bill) was considered in committee.

Lord DARLING formally moved that the amendments which had been made by the Select Committee to which the Bill had been referred should be agreed to. This was done, and the Bill passed through Committee.

Reading University Bill.

The Representation of the People (Reading University) Bill, a measure which gives the franchise to graduates of Reading University on the same lines as other universities, passed through Committee.

HOUSE OF COMMONS.

WEDNESDAY, JULY 4TH.

Rating of Hospitals.

Sir COOPER RAWSON asked the Minister of Health whether he had received any representations from local authorities or charitable organisations with regard to the effect of the operation of the Rating and Valuation Act of 1925 on hospitals and similar institutions; and whether he proposed to take any action in consequence.—Sir KINGSLEY WOOD replied: My right hon. friend has received communications on this subject from the British Hospitals Association and from the authorities of certain hospitals but not from local authorities. I can only refer to the reply which I gave on July 2nd.

Sir C. RAWSON asked if Sir Kingsley Wood was aware that the Sussex County Council had had their assessment raised from £100 to £1600, and if the assessment committees of the different localities were justified in making nominal assessments as they had done hitherto? If not, would the House have any opportunity of discussing the matter at an early date, as it affected so many hospitals all over the country?

Sir KINGSLEY WOOD said that if assessment committees were not acting properly and within the law there was a remedy by way of appeal.

Death of Two Factory Girls at Battersea.

Mr. WILLIAM THORNE asked the Home Secretary whether his attention had been called to the report of the Battersea coroner on the resumed inquest on two girls who died in hospital following illness they had contracted while employed at a scouring-powder works at Battersea; that the medical evidence showed that the cause of death was industrial silicosis and not tuberculosis, as at first diagnosed; that three girls and a boy employed at the same works had died since Jan. 25th, 1927; and if he would take any action in the matter in consequence of the dangerous nature of the work in handling the powder.—Sir W. JOYNSON-HICKS replied: Yes, Sir. A full report has been submitted to me by the Medical Inspector of Factories, who attended the inquest and investigated the circumstances. In the opinion of the medical inspectors these cases originated when the mixing and filling of the powder were done by hand. At the beginning of 1927, on the instructions of the district inspector of factories, mechanical methods of working were introduced. The plant since that date has been totally enclosed, and exhaust ventilation applied to all points where dust is liable to escape. I am advised that the present arrangements should prove effective, but they will continue to receive close attention.

Organised Draws for Hospital Funds.

Sir COOPER RAWSON asked the Home Secretary why a voluntarily organised draw on behalf of the funds of a Hove hospital was stopped by the Home Office while draws conducted on identical lines for other hospitals in Brighton and Hove had not been interfered with; and if an authoritative statement could be made for the guidance of those who organised these and similar functions on behalf of charities.—Sir W. JOYNSON-HICKS replied: The enforcement of the law relating to illegal lotteries is a matter for the local police and not for the Home Office. My attention was drawn to a public lottery at Hove in apparent contravention of the law, and I brought it to the notice of the local police. Had my attention been drawn to the other lotteries referred to, it would have been my duty to bring them also to the notice of the police. As I stated in reply to my hon. and gallant friend, the Member for Dulwich, on July 14th, public lotteries are definitely illegal, and the law does not discriminate between those promoted in aid of charity and other public lotteries. I have no authority to decide what is or is not a public lottery, but it is always open to the promoters of charities to consult the local police on the question whether any proposed lottery appears to contravene the law.

Sir C. RAWSON asked whether, as this particular question would deprive the hospitals in the constituency of Brighton and Hove of some £15,000 a year, the Home Secretary would persuade the Government to introduce legislation to remove some of the anomalies and stupidities of the existing law in regard to gaming.

Sir W. JOYNSON-HICKS said that he had already issued two memoranda on the subject of gaming. The law as regarded lotteries, however, was definite, and did not permit of any action by his department.

Sir C. RAWSON: Will the right hon. gentleman suggest an alteration of the law?

No reply was given to the question.

THURSDAY, JULY 5TH.

Provision for Mentally and Physically Defective Children.

Mr. HARRIS asked the President of the Board of Education how many local education authorities had provided no accommodation up to the present for mentally defective and physically defective children; and were there any authorities without accommodation who were making provision during the current educational triennium.—The Duchess of ATHOLL (Parliamentary Secretary to the Board of Education) replied: According to the information in the possession of my department, there are 240 local education authorities who have provided no special schools of their own for mentally defective children, and 257 who have provided no special schools of their own for physically defective children; but 131 of the former authorities and 221 of the latter send children of these types to special schools provided by other authorities or by voluntary managers, and some 200 authorities make provision for the orthopædic treatment of crippled children. In addition, about 50 authorities have arranged for the supervision of mentally defective children in their areas. As to the second part of the question, the Board already have before them proposals for the provision of five new schools for mentally defective children, and 28 new schools for physically defective children.

Insurance Patients and Vitamin Preparations.

Miss WILKINSON asked the Minister of Health whether he was aware that certain insurance committees had decided that insurance practitioners must not order for their patients vitamin preparations on the ground that they were not drugs but food, while other committees allowed doctors to prescribe vitamin preparations; and whether he could ensure that insurance patients were not deprived of such necessary products recognised by modern medical practice.—Mr. CHAMBERLAIN replied: The question whether any particular preparation can be regarded as a medicine within the meaning of the National Health Insurance Acts is one to be determined by the local insurance committee, and would only come before me formally on an appeal from their decision. I am, however, aware that there is a divergence of practice between committees on the point, and I am proposing to issue a statement for the purpose of assisting insurance practitioners and committees in their consideration of it in future.

Poor-law Medical Officers and Extra Remuneration.

Captain FAIRFAX asked the Minister of Health if he had received an appeal from the Norfolk vagrancy committee for assistance in providing extra remuneration for medical officers of poor-law institutions now called upon, by order of the Ministry, to examine all casuals for small-pox; and, in view of the fact that this work was outside the duties ordinarily performed by these doctors, whether he would undertake to defray all or part of the additional fees involved.—Mr. CHAMBERLAIN replied: The answer to the first part of my hon. and gallant friend's question is in the affirmative, and to the second part in the negative. There are no funds at my disposal out of which such a contribution as is suggested could be paid.

Lead Poisoning Among Painters.

Lord HENRY CAVENDISH-BENTINCK asked the Home Secretary the number of cases of lead poisoning among painters for January, February, March, April and May, 1927, and for the same months of 1928; and what steps were taken to see that the regulations under the Lead Paints Act were being enforced.—Sir W. JOYNSON-HICKS replied: The number of cases reported for the first five months of 1927 was 33, and for the same period in 1928, 40. All cases of lead poisoning and complaints are fully investigated by the factory inspectors. It has always been recognised that on account of the special conditions under which the industry is carried on it would be necessary to rely to a large extent on the coöperation of the industry itself for securing general compliance with the regulations. With this object conferences were arranged with the employers' and operatives' associations, and I am glad to state that both sides have taken steps to impress on their members the importance of a strict observance of the regulations, and have promised to assist the department in every possible way.

Grants in Aid of Health Services.

Sir NICHOLAS GRATTAN-DOYLE asked the Secretary to the Treasury whether he would state for the latest available year the amounts of the following grants to local authorities in England and Wales: percentage grants in aid of the following health services; tuberculosis, maternity, and child welfare; welfare of the blind; venereal disease; and mental deficiency.—Mr. CHAMBERLAIN replied: The following are the percentage grants in respect of the undermentioned health services:—

	£
Tuberculosis	1,640,098
Maternity and child welfare	767,082
Welfare of the blind	3,195
Venereal disease	302,158
Mental deficiency	505,642
	£3,218,175

The foregoing figures do not include the undermentioned amounts granted to voluntary associations:—

	£
Maternity and child welfare	197,119
Welfare of the blind	112,082
Venereal disease	152
Mental deficiency	8,422
	£317,775

Maternal Mortality Figures.

Mr. GROVES asked the Minister of Health the maternal mortality figures for England and Wales for 1924 to 1927, and for the county borough of West Ham for the same periods.—Mr. CHAMBERLAIN replied: The following table shows the numbers of deaths classified as due to childbirth, and rates per 1000 live births, for England and Wales and for West Ham county borough, for the years 1924–27:—

Deaths due to childbirth—

	England and Wales.		West Ham county borough.	
Year.	No.	Per 1000 live births.	No.	Per 1000 live births.
1924 ..	2847	3·90	12	1·66
1925 ..	2900	4·08	20	2·85
1926 ..	2860	4·12	13	1·94
1927* ..	2690	4·11	18	3·00

* Provisional figures.

Anthrax in Human Beings and in Foreign Imported Skins.

Dr. SALTER asked the Home Secretary the number of cases of anthrax which had occurred in human beings and had been notified to his department during each of the last five years; the number of cases in which the disease proved fatal in each of those years; and the number of cases in which the infection was traced to its source or origin.—Sir W. JOYNSON-HICKS replied: The numbers in the years 1923 to 1927 were 50, 45, 48, 42, and 35 respectively, of which 8, 4, 10, 4, and 3 were fatal. In all except 7 of the cases the patient was found to have been in contact with materials likely to be infected with anthrax.

Dr. SALTER asked the Home Secretary whether his department had investigated the serious outbreaks of anthrax at Newcastle, Warrington, and Bolton which had occurred this year; if so, what were the results of the inquiry; whether he had considered amending the regulations dealing with the treatment of hides and skins; whether he proposed to enforce arrangements for the efficient disinfection of foreign imported skins; and whether he intended to issue a welfare order in connexion with tanning and the leather industry generally.—Sir WILLIAM JOYNSON-HICKS replied: Yes, Sir. Each of the cases—eight altogether—reported this year from the three places mentioned has been investigated. It was found that in every case except one the workman had been in contact with hides imported from China. The question of further precautions has for some time past been under discussion with the employers' and workers' associations, but it is agreed that the only measure likely to be effective would be disinfection. Investigations for this purpose were commenced some time ago by the United Tanners Federation, and are being actively pursued, but I regret that no satisfactory method has yet been worked out. The issue of a draft welfare order is also under consideration, and I hope that a decision will be reached very shortly.

MONDAY, JULY 9TH.

Report of Committee on Mental Deficiency.

Mr. HARRIS asked the President of the Board of Education when the Report of the Special Committee set up in 1923 to investigate various problems relating to mental deficiency will be ready; and whether it was proposed to issue the Report as a public document.—The Duchess of ATHOLL replied: My right hon. friend hopes that the Report will be available before the end of the year and that it will be published, but he cannot, of course, give an undertaking at this stage.

The Pace Case and Coroners' Powers.

Mr. PURCELL asked the Prime Minister whether he would consider the matter of making adequate compensation to Mrs. Pace, who had been under police surveillance since Jan. 10th last, had been subjected to severe examination by Scotland Yard officers and a protracted coroner's inquiry, arrested on a charge of murder, kept in prison for a lengthy period, and compelled to undergo all the anguish and terrors on the capital charge, and who had now been released, no case having been proved against her; further, if the right hon. gentleman would institute a public inquiry into the position and powers of coroners, and whether, in the public interest, in view of the heavy expense involved in ensuring adequate legal defence, provision could not be made to guarantee to poor persons, particularly those implicated in charges involving life and death, the fullest and best legal and technical defence free from all cost.—Sir THOMAS INSKIP (Attorney-General) replied: This question raises three very important matters—firstly, the question of compensation to Mrs. Pace; secondly, the proposal to hold a public inquiry into the position of coroners; and, thirdly, a proposal to provide legal assistance for accused persons. In regard to the two last questions I am not now prepared to give any answer, except that these matters will receive due consideration by the proper authorities. With regard to the question of compensation to Mrs. Pace, she has been acquitted by a jury after a very careful and admittedly fair trial. There has been no departure from the ordinary course of the administration of justice. In these circumstances it must be undesirable, in the interests of justice generally, that any proposal for compensation in this case should be entertained.

Mr. MORRIS asked if the Attorney-General proposed to introduce an amendment of the law relating to coroners' juries, and limiting the power of such juries to inquiry into the cause of death only, leaving the verdict to be inquired into by the magisterial courts and the Assize Court.

Mr. MACPHERSON asked if the Attorney-General meant that the Government proposed to institute an inquiry into the question of the coroners' inquisition. If so, would he bear in mind that, in Scotland, there were no coroners and no coroners' inquisitions, and that the progress of justice was always safe and efficient

Sir T. INSKIP: I did not say that the Government are contemplating an inquiry into the question of coroners' inquisitions. What I said was, that the question which has been submitted, at very short notice, will receive due consideration from the proper authorities, and everything would be borne in mind.

Mr. MORRIS said that quite apart from the facts of this particular case, there were two verdicts on record: that of the coroner's jury, finding the person guilty of murder, and the verdict reversing that at the Assize Court. That revealed an illogical state of the law. Was it not desirable, therefore, to amend the law, so as to limit the findings of the coroner's jury to the cause of death alone?

Sir T. INSKIP: Whether that is desirable or not, it is not a proper subject of question and answer, without due opportunity for considering these important matters.

TUESDAY, JULY 10TH.

Hospitals and Motor Accidents.

Mr. HORE-BELISHA asked the Minister of Transport whether, in view of the heavy and increasing burden imposed upon voluntary hospitals in the treatment and maintenance

of motor accident cases, he would consider introducing a Bill rendering insurance compulsory upon all motor drivers and the cost of treatment and maintenance of motor accident cases admitted to voluntary hospitals being made a first charge upon the insurance money.

Sir JOHN MARRIOTT asked the Minister of Transport whether his attention had been drawn to the increasing burden imposed upon voluntary hospitals for the treatment of cases arising from motor accidents; and whether he would introduce legislation to make the insurance of all drivers of motor-cars compulsory and to make the cost of the treatment of motor accident cases a first charge upon the insurance payment.—Colonel W. ASHLEY replied: I have received a copy of the resolution to which the hon. Member refers. The compulsory insurance of all motor vehicles would involve great difficulties, but even if they could be overcome I do not think that it would be practicable to make the cost of treatment and maintenance in voluntary hospitals a first charge on the insurance monies. In order to bring the matter within the scope of a policy of insurance, it would be necessary, in the first place, that the hospital should have an enforceable claim against the patient, and in the second that the patient's injury, if he was a third party, should have been due to negligence on the part of the driver of the vehicle.

Disinfection of Casuals' Clothing.

Mr. SHEPHERD asked the Minister of Health whether, in view of the fact that the method most commonly used for the disinfection of the clothing of casuals rapidly destroyed the material, he would issue regulations to boards of guardians whereby disinfection would not destroy such clothing.—Sir KINGSLEY WOOD replied: My right hon. friend is advised that articles of clothing can be repeatedly disinfected without being damaged, though after a time the process may tend to deteriorate the clothing. He is afraid no regulations which he can issue will alter the position in this regard.

Medical News.

UNIVERSITY OF LIVERPOOL.—At recent examinations the following candidates were successful:—

M.D.

C. B. Bamford, C. A. Birch, J. D. Craig, M. M. Datnow, R. Y. Dawbarn, S. B. Hall, and Nellie Wall-Mesham.

CH.M.

P. R. Hawe and P. Malpas.

M.B. AND CH.B. WITH HONOURS.

Class I.—T. B. Davie,[1 2 3] J. H. Follows,[1 2] and E. W. Jones.[1 2]
Class II.—E. T. Bates,[1] T. L. Dowell,[1] and M. Silverstone.[5]

FINAL EXAMINATION FOR M.B. AND CH.B.

Part III. (Old Regulations).—S. W. Adler, S. Canter, Gladys A. Coventry, Ariel R. S. Deacon, H. R. Dugdale, Ruth M. Fennell, Agnes G. Gillespie, R. G. Gornall, J. J. Graham, G. T. Harris, K. Jilani, Mary G. Jones, W. E. J. Jones, T. Lasker, N. R. Lawrie, H. Leiper, J. R. Mitchell, T. C. Newman, Winifred O'Callaghan, J. Pasvolsky, H. Paterson, H. W. Smith, G. G. Warburton, and A. L. Williams.

[1] Distinction in Medicine. [2] Distinction in Surgery. [3] Distinction in Obstetrics and Gynæcology.

M.B. AND CH.B.

Part A (New Regulations).—A. H. Barzilay, M. J. Bennett-Jones,[7] L. Findlay,[4 5 6 7] A. T. Halton, J. C. Hill, T. N. A. Jeffcoate,[5 7] D. A. Jones, J. Libman,[4 5 6 7] G. A. C. Lynch, J. A. Martinez,[7] H. J. Partington,[4 7] C. L. Pratt, C. K. Sconce, E. B. Whittingham, and J. P. Woodward.[7]
Part I. (Old Regulations).—A. L. Beresford and F. J. H. Crawford.
Part II. (Old Regulations).—J. D. Bright-Richards and Florence M. E. Davies.

[4] Distinction in Special Pathology. [5] Distinction in Forensic Medicine. [6] Distinction in Public Health. [7] Distinction in Pharmacology and General Therapeutics.

D.P.H.

W. T. Donovan, S. C. Gawne, Thirza Redman, Mary H. Wild, and Grace H. Wood.

D.T.M.

J. D. Bilimoria, W. L. Blakemore, K. V. R. Choudari, K. K. Dhar, W. E. Holmes, W. S. Maclay, A. H. Morley, I. Sanderson, and S. Sivalingam.

UNIVERSITY OF MANCHESTER.—At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR M.B. AND CH.B.

G. L. Brown,* Doris Bernard, E. H. Brooks, Mary G. Davies, Ralph Edmundson, Alexandra W. Groves, G. B. Hardman, Simon Kelly, Morris Levine, J. A. Longworth, Stanley Nowell, S. L. Rowley, R. F. Sheppard, Henry Tickle, and J. F. Wilkinson.

* With second-class honours and distinction in obstetrics.

The following have satisfied the examiners in the undermentioned subjects:—

Forensic Medicine.—J. S. Miller.
Medicine.—I. M. Hughes.
Hygiene, &c.—R. T. Wimmer.
Obstetrics and Surgery.—Leslie Bold, Alice M. Butterworth, M. A. Chamberlain, J. H. Pattyson, Evelyn I. M. Sheppard, Raymond Whitehead, and Frederick Wraith.
Forensic Medicine, Hygiene, &c. (new regulations).—Alexander Allan, H. S. Bagshaw, F. H. Bentley, Hedley Boardman, Edith M. Booth, B. R. Bramwell, R. O. Brooks, J. A. K. Brown, Bessie H. E. Cadness, T. H. Chadwick, D. L. Cran, W. W. Fox, J. N. Greenwood, W. H. Harris, R. W. Luxton, F. N. Marshall, A. B. Moffatt, W. H. Newton, H. J. O'Loughlin, G. E. Plowright, B. P. Robinson, Donal Sheehan, C. F. Stott, Nellie Wilson, and L. C. Wright.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.

Richard Handley, J. E. Howie, W. H. Shepley, and Harry Stafford.
Part I.—Nicolas Gebbie.

DIPLOMA IN BACTERIOLOGY.

A. W. Laing.

DIPLOMA IN PUBLIC HEALTH.

Part I.—Andrew Anderson, Frank Appleton, Helen G. M. Bennett, Arnold Brown, J. J. O'Reilly, Jean M. Orkney, Mary I. Prentice, Kathleen Sheehan, and P. H. J. Turton.

FINAL EXAMINATION FOR B.D.S.

S. R. Medd and F. W. Williams.

FINAL EXAMINATION FOR DIPLOMA IN DENTISTRY.

Mary M. Brandwood, Bernard Cooke, D. L. Parkes, J. N. Peacock, L. D. Smith, W. G. Taylor, and G. B. Warburton.

UNIVERSITY OF ABERDEEN.—At a graduation ceremony held on July 3rd the following degrees were conferred:—

Hon. LL.D.—John Alexander MacWilliam, F.R.S., Emeritus Professor of Physiology in the University.
M.D.—Wilfrid Marshall,* Mathilda F. Menzies,† C. S. D. Don,‡ I. G. Innes,‡ Edward James,‡ Beatrix B. Law,‡ Roderick Mackay,‡ Katherine C. Spence‡, Walter Graham, Robina Inkster, Alexander Johnstone, Moore Taylor, and W. L. Yell.

*Awarded highest honours for thesis. †Awarded honours for thesis. ‡Awarded commendation for thesis.

M.B. and Ch.B.—B. S. Cran* and J. A. Gordon* (with second-class honours); Henry Aitken, R. D. Bruce, D. D. Callaghan, S. E. N. Chinniah, Andrew Dickson, William Fettes, J. S. Firth, H. M. Gray, Norman Jolly, J. S. Lawrie, A. W. R. MacKenzie,* R. J. Mackenzie, M. M. Milne, J. L. Nicol, J. M. Paterson, C. S. Philip, Margaret F. Reid, J. S. Robertson, W. M. Smith, Andrew Stephen, C. H. Strachan, Alfred Wilkie,* G. A. Wilson, and J. A. D. Wyness.

* Completed Final Medical Professional Examination with distinction.

B.Sc.—Wilfrid Marshall, M.D.
D.P.H.—J. L. Gammie (with credit), J. R. W. Hay, and A. J. W. Wilkins.

UNIVERSITY OF DUBLIN.—At a meeting of the Senate on June 30th the degree of M.D. was conferred on C. R. Boland, W. S. Dickson, and H. J. Hugo. At recent examinations the following candidates have been successful:—

FINAL EXAMINATION FOR M.B., B.CH. AND B.A.O.

Part I., Therapeutics, Pathology, &c.—*Eva E. Moore, F. O. Pilkington, J. T. Robinson, R. T. O'Shea, Dora G. Bradley, E. S. Tweedy, Frances E. Wilson, R. E. Hemphill, W. A. Robinson, Kathleen A. Wilson, and N. S. Klass.
Part II., Medicine.—C. P. Martin, E. K. Malone, Julius Sayers, D. M. Brink, I. F. Ratthaus, R. H. Bland, Julius Horwich, Nathaniel Burstein, R. I. G. Reid, and J. M. M'Elligott.
Surgery.—W. J. E. Jessop, C. P. Martin, G. W. F. Pratt, I. W. Pigott, H. S. Smithwick, R. F. W. K. Allen, R. H. Bland, E. S. Adderley, Nora A. Stack, D. S. P. Wilson, F. O. W. A. Mahon-Daly, H. R. F. Tweedy, D. M. Brink, E. C. Hicks, Mollie Finegan, A. J. Burden, H. J. Robinson, Marie M. E. Lea-Wilson, and L. R. H. Keatinge.
Midwifery.—*G. C. Dockeray, A. G. Thompson, M. H. Fridjhon, M. E. Kirwan, L. L. Griffiths, W. R. Johnston, Josephine M. Enright, Anna M. E. M'Cabe, J. E. C. Cherry, N. H. Lindsay, and W. A. Y. Knight.

DIPLOMA IN PUBLIC HEALTH.

Part I.—C. R. Nunan, R. A. Q. O'Meara, *Sarah Walsh, Michael Casey, W. A. Dickson, and Mary E. Ryan.
Part II.—C. R. Nunan, P. H. Lemass, Kathleen M. Ball, and Alice E. S. Delany.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS.

Eva Ho Tung.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.

Parts I. and II.—K. K. Drury.

* Passed on high marks.

CONGRESS OF SURGERY IN FRANCE.—The thirty-seventh French Surgical Congress will meet at Paris from Oct. 8th to 13th. Subjects on the agenda are the present status of spinal anæsthesia, the remote results of surgical treatment of duodenal ulcer, and the remote results of cranial trepanning for injuries.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—The annual election of Fellows into the Council was held on July 5th. There were 12 candidates for four vacancies, and the following were elected: Prof. R. E. Kelly (Liverpool), 446 votes; Mr. F. J. Steward (London), 409 votes; Mr. R. G. Hogarth (Nottingham), 407 votes; and Prof. L. P. Gamgee (Birmingham), 399 votes. The number of voting papers received was 1169.

UNIVERSITY OF LONDON: *University College.*—Dr. John Kirk has been appointed demonstrator in the department of anatomy and embryology.

UNIVERSITY OF BIRMINGHAM.—At a Congregation held on June 30th the degree of M.D. was conferred on I. de B. Daly, J. F. Brailsford, and F. W. M. Lamb. The degrees of M.B. and Ch.B., and B.D.S. were conferred on the candidates whose names were given on p. 44 of our last issue as having passed the requisite examinations.—The Queen's scholarships for the third, fourth, and final year were awarded to K. S. Williams, W. C. Smallwood, and G. H. Knight respectively; the Ingleby scholarships to F. R. Roberts and A. B. Taylor, the Arthur Foxwell Memorial medal to A. B. Taylor, the Peter Thompson prize in anatomy to James Hardman, and the Samson Gamgee Memorial medal for surgery to G. H. Knight.

Dr. Frank Gower Gardner, of Oxford, Captain R.A.M.C. (T.) (ret.), has been elected County Director of the British Red Cross Society for Oxfordshire in place of Colonel Stanier Waller, resigned.

COLLEGE OF NURSING.—The College's petition for a Royal Charter, placed before the Privy Council by Sir Cooper Perry, has been successful.

IT is announced that Dr. F. d'Herelle, who has recently been working in India on the treatment of cholera by bacteriophage, has been appointed professor of bacteriology at the Yale School of Medicine, Connecticut, U.S.A.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—The annual general meeting of this institute will be held at the Royal Society of Arts, 18, John-street, Adelphi, London, W.C., on Monday, July 16th, at 5.30 P.M. The Earl of Balfour will preside and deliver a short address. Other addresses will be given by Sir Robert Horne, Sir Martin Conway, and the chairman of the institute, Prof. L. T. Hobhouse.

INTERNATIONAL CONGRESS OF PHYSIOLOGY.—The thirteenth International Physiological Congress will meet at the Medical School of Harvard University, Boston, Massachusetts, from August 19th to 23rd, 1929. The Federation of American Societies for Experimental Biology will serve as hosts to the Congress, and Prof. William H. Howell, of Johns Hopkins University, will be the president. The arrangements for the Congress are in charge of Prof. Walter B. Cannon, of the Harvard Medical School, who is chairman of the Congress Bureau, and Prof. Edwin J. Cohn and Alfred C. Redfield, who are the secretaries.

POST-GRADUATE COURSES IN PARIS.—Holiday courses will be held at the Clinique Médical de l'Hôtel-Dieu from Sept. 10th to 22nd, and from Oct. 1st to 13th, under the direction of Prof. P. Carnot and Prof. M. Villaret. The subjects will be, respectively, Recent Views of Diabetes and Hepatic Diseases, and Recent Views of Digestive Disorders. The interval will be spent in a visit to Vichy. A course on pædiatrics will be held at the Clinique Médicale des Enfants, 149 rue de Sèvres, from July 26th to August 11th, under the direction of Prof. Nobécourt. Those wishing to attend any of these courses should communicate with the Secretary of the Faculty of Medicine (Guichet No. 4) of the University of Paris.

FIRST INTERNATIONAL CONGRESS OF OTO-LARYNGOLOGY.—This Congress takes place at Copenhagen on July 30th and 31st and August 1st, 1928, and intending visitors should send in their subscription without delay. This has been fixed at 30 Danish kroner per head, with the addition of 15 Danish kroner for every lady in the party, and payment can be made with an English cheque if this be dispatched at once to the hon. treasurer, Dr. Jorgen Moller, Vestre Boulevard 13, Copenhagen. On receipt of the subscription a programme will be dispatched from Denmark giving a list of the festivities and excursions in connexion with the Congress and a form on which should be entered an application for the tickets desired. The application form should be returned without delay to the Secretary-General, Dr. N. Rh. Blegvad, Nytorv 3, Copenhagen. Those who have not already secured hotel accommodation should apply at once to Bennett's Tourist Office, 45, Raadhuspladsen, Copenhagen V., while particulars and tickets for the journey can be obtained from Messrs. Bennett, 66, Haymarket, S.W. 1, and Messrs. Thos. Cook and Son, Berkeley-street, W. 1.

Prof. Share Jones, Professor of Veterinary Science at the University of Liverpool, has been appointed President of the Royal College of Veterinary Science.

SANATORIUM'S CHANGE OF NAME.—Highfield Sanatorium, in Edge Lane Drive, Liverpool, will in future be known as Broadgreen Sanatorium.

OSTEOLYSIS IN THE MOUTH.—We are informed that a series of photomicrographs by Dr. Arthur Hopewell-Smith, illustrative of the process of osteolysis as it occurs in the oral cavity, has been added to the annual exhibition of the Museum of the Royal College of Surgeons, Lincoln's Inn-fields, London, W.C. The exhibition will remain open until July 28th.

EXTENSION OF JENNY LIND HOSPITAL.—Mrs. Raymond Maude, daughter of the foundress, has laid the foundation-stone of a new out-patient and special department block of this Norwich hospital for children. The extension, which is being partially paid for by a grant from the Norwich Joint Hospitals and War Memorial Fund, includes accommodation for the electrical, X ray, and massage departments. Mrs. Maude also opened Pym House, a nurses' hostel, formed by throwing two houses into one, which has been provided from a bequest by the late Mrs. Radford Pym.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, July 16th, to SATURDAY, July 21st.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Broad-street, Holborn, W.C. Special afternoon demonstration in Ophthalmology at 3 P.M. on Thurs., by Mr. Caddy. No fee.—PRINCE OF WALES'S HOSPITAL, Tottenham, N. Second week of course in medicine, surgery, and the allied specialties. Daily 10.30 to 5.30 P.M. Further information from the Secretary.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham.

MONDAY, July 16th.—2.30 to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M., Medical, Surgical, Throat, Nose and Ear Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinics. 2.30 to 5 P.M., Medical, Surgical, and Ear, Nose and Throat Clinics. Operations.

FRIDAY.—10.30 A.M., Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

Appointments.

DON, C. S. D., M.B., Ch.B. Aberd., has been appointed Honorary Assistant Physician, Salford Royal Hospital.

FORREST, A. W., M.D., Ch.B. Edin., D.P.H., Medical Officer of Health and School Medical Officer for Leyton.

RUSSELL, G. J. C., M.B., Ch.B. Manch., D.P.H., Assistant Medical Officer for Maternity and Child Welfare, Leeds Corporation.

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne, Lake Hospital and Darnton House.—2nd. Res. Asst. M.O. £150.

Birmingham, Queen's Hospital.—Med. Reg. Also 3 Res. Surg. Officers. £200 and £100 respectively.

Birmingham University.—Walter Myers Travelling Studentship. £300.

Cambridge, Addenbrooke's Hospital.—Resident Anæs. At the rate of £180.

Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.—Jun. H.S. £50. Also Pathologist. £75.

Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C. 2nd. Res. H.S. £75.

Coventry, Coventry and Warwickshire Hospital.—Res. H.P. £125.

Durham County Sanatorium, Hollywood Hall, Wolsingham.—Locum. 9 guineas per week.

East London Hospital for Children, &c., Shadwell, E.—Res. M.O. £200.
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—Hon. Asst. P.
Exminster, Devon Mental Hospital.—Jun. Asst. M.O. £300.
Great Yarmouth General Hospital.—H.S. £150.
Harefield, Middx., County Tuberculosis Sanatorium.—Sen. Asst. Res. M.O. £450.
Leeds City Hospitals.—Med. Supt. £850.
Leeds Public Dispensary.—Sen. Res. M.O. £200. Also Hon. P.
Liverpool, Royal Children's Hospital.—Res. M.O. At rate of £120. Also two Res. H.P.'s and two Res. H.S.'s. Each at rate of £60.
London Female Lock Hospital, 283, Harrow-road, W.—H.S. At rate of £150.
London School of Hygiene and Tropical Medicine, 25, Gordon-street, W.C.—Research Student in Tropical Pathology. £250.
Marseilles, Queen Alexandra Memorial Hospital.—Res. M.O. At rate of £150.
Middlesex Hospital and Medical School.—Surgical Registrarship. At rate of £300.
Newark Hospital and Dispensary.—Res. H.S. At rate of £150.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Nottingham, City Mental Hospital.—Jun. Asst. M.O. £350.
Nottingham General Hospital.—Res. Cas. O. At rate of £200.
Nottinghamshire County Council and Mansfield Woodhouse Urban District Council.—Joint M.O. £700.
Portsmouth, Royal Portsmouth Hospital.—Sen. H.S., also Cas. O. At rate of £200 and £100 respectively.
Preston and County of Lancaster Royal Infirmary.—H.P. and H.S. £190 and £150 respectively.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Royal Army Medical Corps.—Commissions.
St. John's Hospital, Lewisham, S.E.—Res. H.O. Also Res. Cas. O. Each at rate of £100.
St. Luke's Hospital, Chelsea, S.W.—Consulting Physician. 100 guineas.
Society of Apothecaries of London.—Examiner in Midwifery.
Staffordshire, Lechfield County Laboratory.—Bacteriologist. 10 gns per week.
Taunton, Taunton and Somerset Hospital.—Sen. and Jun. House M.O.'s. At rate of £150 and £100 respectively.
West London Hospital, Hammersmith-road, W.—Res. Asst. Surg. £200.
Woolwich and District War Memorial Hospital, Shooters' Hill, S.E.—Sen. H.S., also H.P. Each at £125.
Worcester County and City Mental Hospital, Powick, near Worcester.—Jun. Asst. M.O. £300.

The Chief Inspector of Factories announces the following vacancies for Certifying Factory Surgeons: Falkland (Fifeshire), Bourton (Dorsetshire), Rothwell (Northamptonshire), Llanfairfechan (Carnarvonshire), Wirksworth (Derbyshire), and Crook (Co. Durham).

Notice is given of a vacancy for a Medical Referee under the Workmen's Compensation Act for Edinburgh City and Linlithgow County (Sheriffdom of the Lothians and Peebles). Applications should reach the Private Secretary, Scottish Office, Whitehall, London, S.W., not later than July 28th.

Births, Marriages, and Deaths.

BIRTHS.

BATEY.—On July 4th, at Beaufort House, Ealing, W., the wife of Maurice Batey, L.D.S. R.C.S. Eng., of a son.
DIX.—On July 6th, 1928, at 11, Alexandra Park-road, N. 10, to Nan, the wife of Victor Dix, F.R.C.S.—a daughter.
HERN.—On July 2nd, at Lexham-gardens, W., the wife of Dr. J. R. B. Hern, of a daughter.
KINGDON.—On July 4th, the wife of A. T. L. Kingdon, M.R.C.S., L.R.C.P., of South-street, Leominster, of a daughter.

DEATHS.

BOWKER.—On July 6th, at North Parade, Bath, George Edward Bowker, M.D. Edin.
PARSONS.—On July 2nd, at Bournemouth, John Inglis Parsons, M.D., M.R.C.P., M.R.C.S., aged 71.
PRITCHARD.—On July 6th, W. Clowes Pritchard, M.R.C.S., L.R.C.P., of Hastings.
STONEY.—On July 5th, at Abbeyleix, Ireland, Hugh Baker Stoney, M.B.
WIGGINS.—On July 3rd, suddenly, Charles Wiggins, M.R.C.S., L.R.C.P., of Argyll, Fortis Green, East Finchley.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. I., 1928.

THE Index and Title-page to Vol. I., 1928, which was completed with the issue of June 30th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Notes, Comments, and Abstracts.

HOSPITAL LAW.

LIABILITY OF HOSPITALS AND THEIR PROFESSIONAL STAFFS.

BY CAPTAIN J. E. STONE, *M.C.*, F.S.A.A.,
HON. SECRETARY, INCORPORATED ASSOCIATION OF HOSPITAL OFFICERS.

II.*—LIABILITY OF SUBORDINATES.

PHYSICIANS and surgeons of a hospital are not necessarily liable for injury caused by the carelessness of their subordinates in carrying out the treatment ordered by them, unless it can be shown that the matter was one which ought not to have been left to a subordinate, or that they had themselves neglected some precautions which ought to have been taken, or had superintended or been present at the carrying out of the treatment. Thus, where a patient was severely scalded by reason of the negligence of a nurse in administering a hot bath ordered by the surgeon, it was held that the surgeon was not liable. It was proved to be the usual hospital practice to leave it to the nurses to see to the baths. The decision, however, does not deal with the question whether or not the hospital itself was liable for the negligence of the nurse.

A sister or nurse may equally be liable for negligence in carrying out the duties entrusted to her. In the case above mentioned, the action which failed against the surgeon would probably have succeeded against the nurse. Members of the nursing staff may also incur liability if they exceed the duties assigned to them; their functions are subordinate to those of the physician and surgeon, and any attempt by nurses to usurp the place of a qualified medical officer might place them in peril.

Where the injury to a patient is the immediate result of intervening negligence on the part of the patient himself, or where the patient by his own carelessness directly contributes to it, the patient's contributory negligence is a good defence to an action. Where, however, damages are obtainable, and the patient dies, they may be recovered for the benefit of his or her wife, husband, parent, or child.

Criminal Negligence.

There is a distinction between the negligence which gives right to damages in a civil action and the negligence sufficient to support a conviction in a criminal case. The distinction, however, is not clear, and it is perhaps rather a question of degree. Gross negligence is of two kinds, as for example: (1) when a physician deliberately neglects his patients; and (2) when a person without skill in his profession ignorantly and rashly uses dangerous medicine. Criminal liability is incurred by a competent person for death occasioned by gross want of care; as, for example, by insufficient attention to a woman after her confinement. Malpractice, which generally means an unprofessional treatment of disease, pregnancy, or body injury, either from gross carelessness or ignorance, or with criminal intent, would certainly extend to the performance of operations for mere curiosity or experiment, which is a criminal offence. *Mala praxis* is a great misdemeanour and offence at common law (whether it be for curiosity or experiment, or by neglect), because it breaks the trust which the party has placed in the physician. Doctors and nurses may therefore incur personal liability: (*a*) to an action for damages for incompetence and negligence; (*b*) to criminal proceedings for malpractice and criminal negligence.

Relationship of Professional Staff to Hospital.

As liability for criminal acts cannot extend beyond the persons themselves, it is only in respect of their liability to a civil action that the question of the consequent liability of the hospital whom they represent need be considered. It is clear that the foundation of any such liability must rest upon the law of agency. The general doctrine of law is that although the principal is not ordinarily liable (for he sometimes is) in a criminal suit for the acts or misdeeds of his agent, unless indeed he has authorised or coöperated in those acts, &c., yet he is held liable to third persons in a civil suit for the frauds, deceits, concealments, misrepresentations, negligences, and other malfeasances or misfeasances and omissions of duty of his agent in the course of his employment, although the principal did not authorise, justify, participate in, nor indeed, know of such misconduct, or even if he forbade the acts or disapproved of them. In

* The previous article of this series appeared in THE LANCET of April 28th, p. 895.

all such cases the rule applies *respondeat superior*, and it is founded upon public policy and convenience, for in no other way could there be any safety to third persons in their dealings, either directly with the principal or indirectly with him through the instrumentality of agents. In every such case the principal holds out his agent as competent and fit to be trusted, and thereby in effect he warrants his fidelity and good conduct in all matters coming within the scope of his agency.

Who are servants of a hospital?—The principle is well established that a master is liable for the negligence of his servant who is acting in the course of his employment. This principle of liability applies to hospitals in the same way that it applies to individuals. The term "servant" has in law a much more restricted meaning than that which is popularly attributed to it. A servant has been defined as—"Any person employed by another to do work for him on the terms that he, the servant, is to be *subject to the control and direction of his employer* in respect of the *manner* in which his work is to be done." A servant as thus defined must be distinguished from an independent contractor. The test is the existence of a right of *control* over the agent in respect of the *manner* in which his work is to be done. A servant is an agent who works under the supervision and direction of his employer; he is employed to obey his employer's orders from time to time. An independent contractor is one who is his own master; he is engaged to do certain work, but he exercises his own discretion as to the mode and time of doing it. A hospital board will accordingly be responsible for the negligent acts or omissions of a servant in the course of his employment. The servant must be in the employ of the board at the time the acts complained of are done.

Who of those persons appointed by hospitals are servants of the hospital? This question must be answered in respect of every individual or class of officers. The persons engaged in a hospital may for convenience be classified as follows: (1) Physician and surgeons (including house officers, anæsthetists, and specialists); (2) nursing staff; and (3) lay or non-professional staff.

With regard to the first named class it has been expressly decided (Hillyer *v.* Governors of St. Bartholomew's Hospital) that the relationship of master and servant does not exist between the governors of a hospital and the physicians and surgeons who give their services to the hospital. It was held that they are professional men, employed by a hospital to exercise their profession to the best of their abilities according to their own discretion; but in exercising it they are in no way under the orders nor bound to obey the directions of the hospital authorities. It is true that a hospital has power to dismiss these officers, but it has this power, not because they are servants, but because of its control over the hospital where their services are rendered. A staff surgeon or physician then is not an employee of the hospital but holds an independent professional relation; he, not the hospital, is liable for his acts, and by reverse reasoning the hospital would not be liable for injuries which he might suffer in the course of his work in the hospital. A medical superintendent is, however, more directly associated with the board. He is, in general, appointed by the board at a fixed salary under a special contract with the board, and usually has control over all departments of the hospital, and the treatment of the patients therein. It may be contended, however, that as far as the treatment of patients is concerned, he is not a servant of the board because he is not subject to the control of the board as to the mode of treatment he adopts. The degree of control which a board may exercise over a medical superintendent undoubtedly varies in different cases, but it is most unlikely that in every case a board would have the power of dictating in what way he should conduct operations or treat patients. This is entirely a matter for the superintendent in the exercise of his professional skill and knowledge. House officers are employees of the hospital when acting under the direction of the hospital authority, but they also hold a quasi-professional relationship, and in addition they have a special relation to the physician or surgeon whom they may be asissting. In Cooper *v.* Mirron and Another, a house officer was held liable for so extracting a tooth that a part broke off and passed down the windpipe. The accident was not reported to his senior; pneumonia set in, and the patient died.

With regard to the second class, the position of the nursing staff of a hospital is, however, not so clearly defined. They are engaged by the board at fixed salaries, their hours of attendance in the wards and general duties are prescribed by the board by whom they are paid and by whom they may be dismissed. These features point to the fact that they are servants of the board; for all general purposes this is undoubtedly the correct view, but they are not so for the purposes of operations and examinations by medical officers. Nurses (and indeed other officials) assisting at operations cease for the time being to be servants of the hospital inasmuch as they take their orders from the operating surgeons alone and not from the hospital authorities. Can they be deemed the servants of the board when attending patients in the wards and acting in their professional capacity? All nurses require a special training to fit them for their occupation, and it may be argued that they are not subject to the control of the board in the manner in which they do their work. In their treatment of, and attendance on, patients, they act either under the direction of physicians or in accordance with their professional skill and knowledge. The board is not, it is contended, in a position to dictate in what way the work is to be done. Although it fixes the hours, supplies necessary board and lodging, pays and dismisses nurses, it cannot control them in the exercise of their profession as nurses. From this point of view they are not the servants of the board in the course of any of their professional duties. The dicta of Kennedy L.J., in Hillyer *v.* St. Bartholomew's Hospital support this view. He classes nurses as experts along with physicians and surgeons, and states that, provided the board has been reasonably satisfied as to their competency, it will not be liable for their negligence. This of course refers only to the conduct of the staff in matters of *professional skill*, in which the board *neither do nor could not properly interfere* either by rule or supervision. The board would, it is contended, be legally responsible to the patients for the due performance of their servants within the hospital, of their purely *ministerial or administrative duties*, such as for example, attendances of nurses in the wards, the summoning of medical aid in cases of emergency, the supply and service of food, and the like. The board ought to make, and invariably does make, its own regulations in respect of such matters of routine, and it is obviously legally responsible for their sufficiency, their propriety, and observance of them by their servants. The scope of these ministerial duties or matters of routine is difficult to define. It will generally be found that most of the duties of the nurse are professional, and required special skill or knowledge. In matters, however, which do not require special skill nor knowledge, nurses must be regarded as the servants of the board, and in such matters the board may properly interfere. These matters will be few in number, and a nurse will, therefore, in general not be the servant of the board.

All other officials and employees about the hospital are with certain exceptions, servants of the board. Exceptions occur when they are working under the exclusive control of physicians and surgeons and other medical and nursing experts.

The Duty and Obligations of the Board.

Although the board is not responsible for the negligence of its professional staff in the exercise of their profession, it is under the duty to see that the professional staff employed by it are competent. It undertakes that the patients in and attending the hospital will have competent advice and assistance. (Evans *v.* Liverpool Corporation). The governors of a hospital, by their admission of the patient to enjoy in the hospital the gratuitous benefit of its care, tacitly undertake that the patient whilst there shall be treated by experts, whether surgeons, physicians, or nurses, of whose professional competence the governors have taken reasonable care to assure themselves; and further, that these experts shall have at their disposal for the care and treatment of the patient fit, adequate, and proper apparatus and appliances. There is no right legal inference from the circumstances of the relation of hospital and patient that the hospital authority makes itself liable in damages if members of its professional staff, of whose competence there is no question, act negligently towards the patient in some matter of professional care or skill, or neglect to use intelligently in their treatment the apparatus or appliances which are at their disposal. If, then, a hospital board exercise reasonable care in the selection of its professional staff by requiring satisfactory evidence of their competency, it will not be liable subsequently for the negligence of its staff. If, of course, for any reasons it has good ground to doubt the competency of any member of its staff under circumstances which would justify it in dismissing such member, it should do so.

Paying Patients.

In Foote *v.* Shaw Stewart, an attempt was made to distinguish the circumstances from the St. Bartholomew's case, in respect that the Greenock Hospital authorities, by receiving a fee of £2 2s. from the patient, undertook that the treatment which she should receive from the doctors would be reasonably skilful and careful. Otherwise stated, this argument implied that though to the ordinary charity or non-paying patient the duty of the hospital was simply to provide the services of a competent staff of medical men, yet to a paying patient they were bound to ensure a special degree of medical care and attention, or a guarantee of skill on the part of the surgeon. The court held that, in the absence of a contract much more specific and definite than could be implied from the plaintiff's arguments, they could make no distinction between the two cases.

A MEDICAL JOURNAL FOR CUBA.

THE *Anales de la Faculdad de Medicin y Farmacia*, of which the first two numbers have reached us, is described as a quarterly publication, started to record the work of the Medical Faculty of the University of Havana at a moment when it seems to be undergoing some reorganisation and reconstruction. Among the contributions there is none of outstanding importance, but several of considerable interest. Prof. P. Escudero, of Buenos Aires, states his views on "latent diabetes," which he differentiates from "diabetes occulta" by the fact that there is no hyperglycæmia; which, however, can be produced by a method of dieting which he has devised and terms blocking of the pancreas. The cases are characterised clinically by various chronic disorders, and can be cured by large doses of insulin, of which they are very tolerant. There are also in the first number papers on a case of benign giant-celled tumour of the metacarpals, endothelioma of the skin, prostatotomy in retention due to acute gonorrhœal infection, and the surgery of the thyroid. In the second number there is an article on a case of multiple myelomata in an infant beginning before 17 months of age and ending with albumosuria. Prof. Pardo Costello deals with the relation between herpes and varicella and concludes that it is accidental. Dr. Ostiz Machado describes some experiments on the production of nephritis in rabbits by administering sodium chloride with a vegetarian and milk diet respectively, and also by giving white lead. A paper in the first number on the selection of medical students is interesting as revealing the fact that the teaching schools of both North and South America are seriously hampered by the great and persistent increase in the number of students seeking to enter the medical profession, an increase out of proportion to the needs of the population, and in the Latin republics, at all events, partly due to social ambition.

THE POTENTIAL ENERGY OF THE FŒTUS.

A SOMEWHAT new conception of obstetrical mechanics is contained in a lecture delivered last year before the Obstetrical Society of Vienna by Dr. J. F. Beruti, of Buenos Aires, which has been published in the *Semana Médica* (April, 1928, p. 937). Starting from the work of Sellheim, of Leipzig, the author claims that he does not go far enough in his conception of the fœtus as an active agent in parturition. With the aid of ingenious models made to represent the mechanism of labour he believes he can show that there are two kinds of active fœtal reaction, which originate from the double resistance of the maternal canal and the fœtus itself. The first is the potential energy or elasticity of the fœtus and the second is muscular contraction. The second factor is said to be the cause of the change of position of the head sometimes observed during labour in the pauses between uterine contractions. Little other clinical evidence is adduced in favour of Dr. Beruti's view.

APPARATUS FOR INDUCING ARTIFICIAL PNEUMOTHORAX.

Dr. F. de V. Kováts[1] describes and illustrates a new instrument which appears to be a definite advance on those now employed for the induction of artificial pneumothorax. It consists of two cannulæ, one of which, having a blunt end and a lateral aperture, fits closely into the other, which has a sharp point and a terminal opening. The other ends of the cannulæ are so arranged that by turning a flange the inner cannula takes up one of three positions. In the first position the blunt end of the inner cannula lies wholly within the outer; in the second the blunt end of the inner cannula is made to project beyond the sharp end of the outer, but the lateral aperture is not exposed; in the third position, by a further turn of the flange, this aperture becomes exposed.

The technique for the induction of pneumothorax is as follows. The instrument is attached to the pneumothorax apparatus, and with the cannulæ in the first position the needle is pushed through the skin almost down to the parietal pleura. A turn of the flange allows the blunt end of the inner cannula to be pushed beyond the sharp point of the outer, and the pleura is then punctured with the blunt end, after which the flange is again turned to expose the lateral aperture of the inner cannula to the pleural cavity. The manometer at once registers the intrapleural pressure and the air can then be injected.

The advantages of the apparatus appear to be: (1) the oscillations of the manometer indicate that the pleural space has been reached as soon as the parietal pleura is pierced; (2) the danger of puncture of the lung is lessened by the fact that the inner cannula has a blunt end; (3) the lateral aperture cannot be blocked by pieces of skin or other tissue; (4) no manipulation of the needle is necessary after the pleural space has been reached; (5) the possibility of air embolism is almost negligible; and (6) the same apparatus may be used for both the induction and the refills of the pneumothorax cavity.

[1] Deutsch. med. Woch., May 25th, p. 875.

WOMEN'S HOLIDAY FUND.

To the Editor of THE LANCET.

SIR,—The result of our yearly appeal in the press has been of such value in the past that we trust you will once more allow us space in which to plead the cause of this Fund. Just now many fortunate people are engaged in the all-important task of making plans for their summer holiday—a delightful and necessary change of scene. We would ask them not to forget the many hundreds of women in London who have little chance of getting away from the monotony of their daily life, who in many cases have never tasted the joy of a seaside or country holiday, and whose health is suffering in consequence. This Fund, which was founded in 1895, organises every summer a fortnight's holiday at the seaside for many of these tired women who contribute what they can towards the full cost (£3 for a fortnight including railway fare). Last year 864 women were sent away and 500 of these took their babies. Will all holiday-makers help us to increase the number this year by sending some contribution, however small, to the Secretary, Women's Holiday Fund, Denison House, Vauxhall Bridge-road, S.W. 1.

We are, Sir, yours faithfully,
A. F. LONDON.
MANUEL L. BIDWELL,
J. SCOTT LIDGETT,
HELEN A. POWNALL
(Chairman of Executive Committee).

76, Denison House, 296, Vauxhall Bridge-road, S.W.,
July 10th, 1928.

AN INTERESTING DINNER.

A DINNER was given by the proprietors of Eno's Fruit Salt on Friday, July 6th, at the Savoy Hotel, Colonel Alhusen, the chairman of the Company, presiding over a large gathering. The occasion was made interesting by the opening which it gave for admirable speeches from Sir Robert Horne, late Chancellor of the Exchequer, and Mr. Amery, the Colonial Minister, who approached the subject of honest trading from completely different angles, but pointed out alike that in its success resided the finest promise for the conduct of imperial affairs. Sir Robert Horne, from vast personal experience, spoke of the value to the British trader of maintaining and extending relations with the Dominions, and probably surprised his audience by stating the ratios of trade between the mother country and the continent on the one hand, and the mother country and our dependencies on the other. The conclusion that it is to the interest of all to promote the colonial markets was inevitable on his showing. To the guests at the dinner there was presented a charming brochure written by a well-known group of journalists and experts and illustrated, among others, by Mr. Arthur Rackham, Mr. E. J. Sullivan, Mr. Lewis Baumer, and Mr. Bernard Partridge. Save Mr. Partridge's introductory cartoon both articles and pictures were deliberately humorous, but at the same time a clear picture of a leading figure in the early Victorian era of commerce emerged in a contemporary environment.

Messrs. H. K. Lewis, of 136, Gower-street, London, W.C., have published a pamphlet setting out the services which they render to the medical profession, and describing the progress of their business since its foundation in 1844. Besides their bookselling department, which executes orders by post, they maintain a large circulating library intended to meet the needs of those who wish to keep in touch with the latest opinions and discoveries. A monthly list of new books and new editions added to the library is sent regularly post free, and a reading and writing room for subscribers is provided. The library contains some 30,000 volumes, and the complete catalogue, revised to December of last year, with upwards of 18,000 titles, will be published shortly. Surplus copies of books withdrawn from circulation are sold at reduced prices in the second-hand department, 140, Gower-street, where a large stock of books is always kept. Scarce books or those out of print are advertised for without charge and reported when found.

The Radiotherapy of Cancer.—The personnel of the sub-committee of experts charged by the Cancer Commission of the League of Nations with the study of radiotherapy of cancer was given in THE LANCET last week. The description of Mr. Comyns Berkeley should have run: Director of the Gynæcological Service, Middlesex Hospital Cancer Charity.

"Swimeezi" Bathing Costume.—We are informed that the address of the Institute of Patentees referred to in our notice of the above invention is now at 39, Victoria-street, Westminster, S.W. 1.